The FLEET OWNER

Wedge-11-50

In This Issue:

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Publ'n FLEET OWNER

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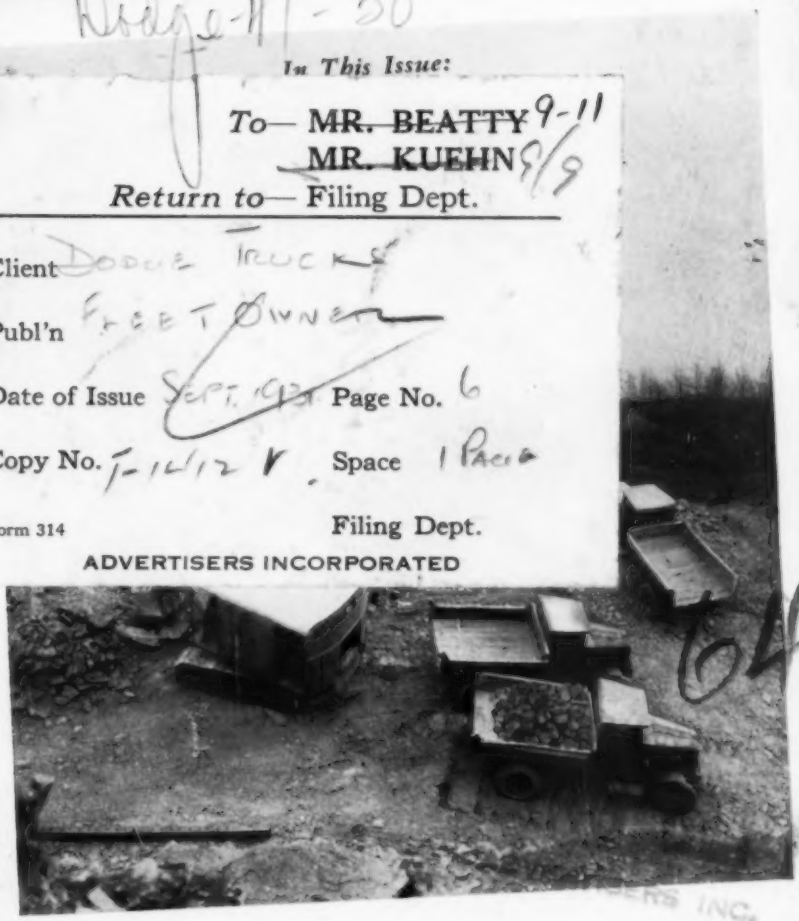

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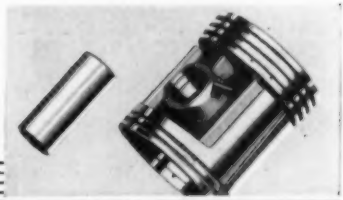

Thompson Valves and Guides; King, Shackle, Tie Rod Bolts and Bushings; Eccentric Tie Rods; Pistons and Pins; Tryon Shackles.

When speedometers begin to show big figures it's time to consider your maintenance budget. You buy tires, gas and oil on a mileage basis right along. Why not consider necessary overhaul jobs in the same light? Don't aim just to "get by" with makeshift repairs. Look farther ahead. Add thousands of profitable miles to your equipment by *replacing* worn-out parts with genuine Thompson products. It's cash in your pocket in the long run.

THOMPSON PRODUCTS
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General Offices:
Cleveland, Ohio, U. S. A.
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BOSCH
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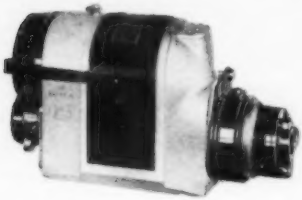

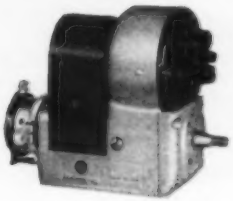

THE American Bosch Magneto and Bosch Super-Energy Magneto are designed and built for punishing service over all kinds of the roughest roads and the most heart-breaking hills in all weathers.

These magnetos are built to stand up and deliver continuously without let-up or lay-up for years. They are economical, efficient and dependable under all conditions of service, and they are quickly and easily installed. Ask the Bosch or American Bosch dealer in your neighborhood.

B O S C H
ROBERT BOSCH A. G.
Pyro-Action Spark Plug

B O S C H
ROBERT BOSCH A. G.
Semaphore

B O S C H
ROBERT BOSCH A. G.
Vibro-Balanced Horn

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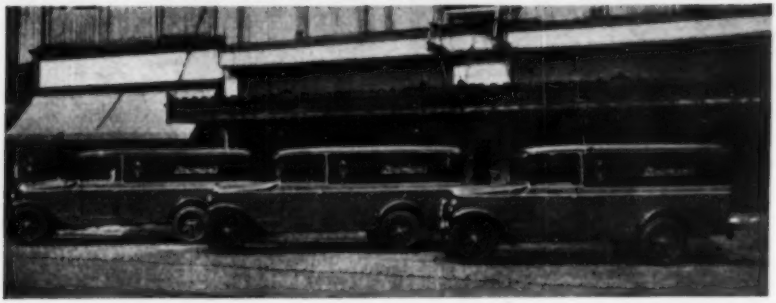
UNITED AMERICAN BOSCH CORP'N
SPRINGFIELD, MASS. *Branches:* New York, Chicago, Detroit, San Francisco

DON'T GAMBLE WITH WEATHER



THIS STORE, WITH ITS FINE DELIVERY TRUCKS, DOES NOT GAMBLE ON AN ANTI-FREEZE

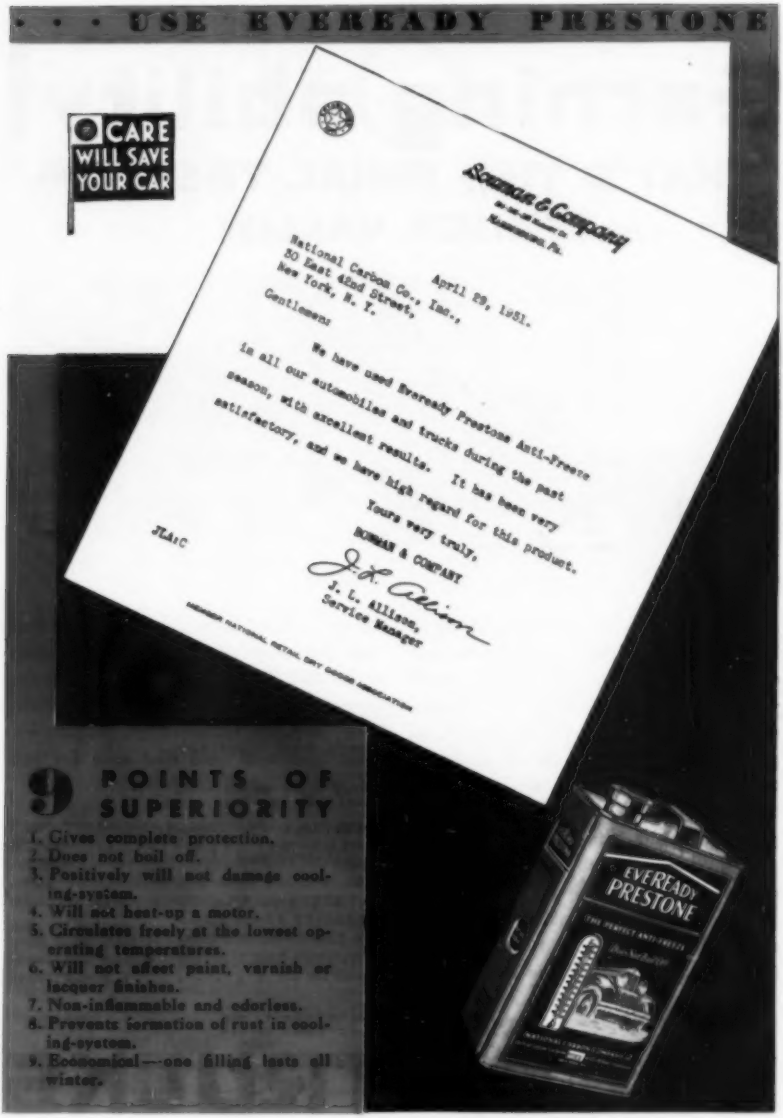
THE fleet of handsome trucks, operated by Bowman and Company, of Harrisburg, Pa., represents a big investment in delivery service. Last winter, this great store used Eveready Prestone to insure the efficiency of their service to customers, and to protect their fleet against cold-weather damage. They know that it doesn't pay to gamble with valuable equipment at stake!

Makeshift anti-freezes, with the necessity for constant testing and frequent refilling, can be a source of worry and expense. Eveready Prestone gives safe, sure, all-season protection on a single filling. It is a concentrated product—figured by the *season*, not by the *gallon*, it is the most economical you can buy.

Eveready Prestone is now improved and perfected. It has less tendency to leak than water. It retards rust, and helps prevent clogging in the cooling-system. It won't boil off, and it won't freeze. This year, get one supply of Eveready Prestone and be safe all winter.

NATIONAL CARBON COMPANY, INC.
General Offices: New York, N. Y.
Unit of Union Carbide UCC *and Carbon Corporation*

EVEREADY PRESTONE


• • • USE EVEREADY PRESTONE
CARE WILL SAVE YOUR CAR
Bowman & Company
April 29, 1931.
National Carbon Co., Inc.,
30 East 42nd Street,
New York, N. Y.
Gentlemen:
We have used Eveready Prestone Anti-Freeze in all our automobiles and trucks during the past season, with excellent results. It has been very satisfactory, and we have high regard for this product.
Yours very truly,
BOWMAN & COMPANY
J. L. Allison,
Service Manager
JLAic
9 POINTS OF SUPERIORITY
1. Gives complete protection.
2. Does not boil off.
3. Positively will not damage cooling-system.
4. Will not heat-up a motor.
5. Circulates freely at the lowest operating temperatures.
6. Will not affect paint, varnish or lacquer finishes.
7. Non-inflammable and odorless.
8. Prevents formation of rust in cooling-system.
9. Economical—one filling lasts all winter.
EVEREADY PRESTONE

When Writing to Advertisers Please Mention THE FLEET OWNER

Earning ability!

THAT'S THE FINAL TEST OF TRUCK VALUE

After all, the final test of a truck's value is its earning ability. Dodge Trucks not only earn—they earn more, for several very definite reasons. » » Typical of Dodge value is the Standard 1½-ton chassis. Its price—only $595 f. o. b. Detroit—calls for but a small investment. Then, because of this truck's many exceptional features, you get greater dependability, ample power, ease of control, speed, safety, economy and long life—all an assurance of maximum earning ability. » » Inspect and test this 1½-ton truck or any of the many other Standard or Heavy-Duty types in the Dodge line. You will find that the experience gained in building over 400,000 quality Dodge Trucks assures you a truck that is precision-built and perfectly balanced part-to-part—a truck that will work and earn for you every mile of its long life.

* * *

PAYLOAD CAPACITIES IN THE HEAVY-DUTY LINE RANGE FROM 3,600 TO 11,175 POUNDS—AND UP, FOR TRACTOR AND TRAILER SERVICE. PRICES ARE EXCEPTIONALLY LOW. » » THE STANDARD LINE RANGES IN PAYLOAD CAPACITY FROM 1,200 TO 4,300 POUNDS AND INCLUDES THE 1½-TON CHASSIS AT . . . . .

$595

F. O. B. DETROIT

DEPENDABLE DODGE TRUCKS

"For Those Who

The FLEET OWNER

Service Their Own"

Published Monthly by

The Ferguson Publishing Co., 90 West St., New York City

ARTHUR D. FERGUSON
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A. L. CONLEY
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Subscription
$1.00 Yearly

HENRY CLAY FISCHER
Editor

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2cts. a mile, $4 a day, $1200 a year, that's what this Aluminum body saves

Take two truck chassis identical in every respect. Equip one with a heavy metal body. On the other mount a body made of the strong alloys of Alcoa Aluminum, which are equivalent in strength to structural steel, yet weigh only 1/3 as much.

Load each truck to its maximum capacity and start them out over identical routes. Keep accurate cost records on both steel and aluminum bodies. Charge up rent, depreciation, service cost, oil, tires and maintenance. Include every possible item of expense in your calculation.

Then check the figures. What do you find? Just this; that the truck with the body lightened by the use of the strong alloys of Alcoa Aluminum saves an appreciable amount per mile in operating cost. It carries more pay-load with the same operating expense. You find that the heavy body costs you a goodly sum of your hard-earned money just to haul a lot of surplus dead-weight; dead-load which represents dead-loss.

These were the findings reported by Mr. C. A. Fuller, of the Fuller Coal Company of St. Louis.

Mr. Fuller's report adds that by lifting 1000 lbs. from the body weight, and putting 1000 lbs. of coal in its place, he saved 2¢ a mile. Averaging 200 miles per day, this means a saving of $4 a day, $1200 a year.

These savings paid for the extra cost of the aluminum body in 6 months. The investment paid 200% per annum. This answers the question conclusively as to whether you can afford aluminum bodies. The question now is how can any operator possibly afford not to have them.

Standard structural shapes of the strong alloys of Alcoa Aluminum from which truck bodies are made are carried in stock. Sheets, plates, molding, rivets, bolts and screws are also available.

The booklet, "Alcoa Aluminum for Truck Bodies," contains the histories and operating data of many aluminum bodies now in use. It also has working drawings and bills of material for several different types of bodies. Write for it. ALUMINUM COMPANY *of* AMERICA; 2461 Oliver Building, PITTSBURGH, PENNSYLVANIA.

ALCOA ALUMINUM

When Writing to Advertisers Please Mention THE FLEET OWNER

The FLEET OWNER

"For Those Who Service Their Own"

PUBLISHED monthly in the interests of Automotive Fleet Owners who maintain their own Repair and Service Shops, and devoted to the better Operation and Maintenance of Truck, Passenger car, Bus, and Taxicab Fleets.

HENRY CLAY FISCHER, EDITOR

Vol. 7 New York, September, 1931 No. 3

Reciprocity Helps All of Us

ONE phrase strikes our particular fancy this month. It is contained in our leading article and, to be specific, appears on page 11. It refers to one fleet operator's "strictly modern building" which was erected "after a very careful study, by the management, of other operations and their service requirements and accommodations."

These few words strikingly emphasize the value of *reciprocity* in this business of automotive fleet operation and maintenance. To quote further: "Many of the ideas thus gained were incorporated in the construction of the building, which might not have been, had it not been for the courtesy of these other operations."

If your management is thinking of making extensive changes in the shop layout, of expanding into newer quarters or even remodelling the old garage, it will pay you to visit some of the other fleet operations in your vicinity. We do not presume that you shall follow in their footsteps, but surely you can at least benefit from the advantages they are enjoying and the mistakes they have made. That every courtesy will be extended, there is little question.

Reciprocity is the keynote around which this publication functions. It is the keystone that holds together the foundation. No professional writer can compete with the maintenance superintendent, when it comes to facts, figures and real "low-down" on efficient maintenance.

For that reason our editorial policy has been and always will be based upon the widespread interchangeability of fleet maintenance men's experiences and observations. Feature articles such as Mr. Rishel's, from which the foregoing has been quoted, are but one of the means by which we pass on to you the other fellows' ideas. The "Question-of-the-Month Club" is another method. We are the "clearing house," of course.

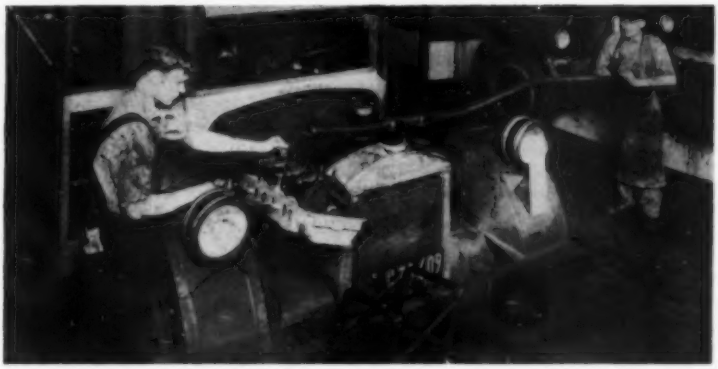
As our "parting shot," remember that reciprocity is another name for cooperation. If you have found it convenient to put any of your impressions down on paper, don't hesitate to send them in to the Editor, we will call and get them, if you prefer. The "other fellow" will be glad to get your particular thoughts; you will be interested in getting his.

If you haven't up to the present participated in our "Question-of-the-Month Club" (see pages 34-35) it's never too late to start. We have made it as easy as it is physically possible, and the questions are not as difficult to answer as they might appear. The thing to bear in mind is that the "other fellow" *might* have something that you never thought of, and, inversely, some of *your* ideas might register favorably and beneficially to him.

Road Building Well Under Way

OUR front cover picture this month might be called a truly unusual photograph. Besides showing part of a fleet of trucks at work on a highway construction project, it is unique from a photographic standpoint.

The State of Pennsylvania, wherein this picture was taken, knows full well that no State can afford to neglect its roads. This State has gone on extending the vital arterials so that commerce may flow freely. Other states are carrying on extensive road building programs throughout 1931. The indispensability of the motor truck in this line of work is quite obvious. The heavy-duty truck is popular with the road-builder.



Servicing 303 Vehicles

Maintenance Procedure and Typical Short Cuts as Practiced in Los Angeles Railway Fleet

By Doyle Rishel*

MAINTENANCE is, to my mind, a mighty big job for anybody, not only when considered from an economical but also from a mechanical standpoint, if it is to be carried out conscientiously, as there is always the danger of the one in charge going to the extreme either in the use of too much economy or to the other extreme of over-maintenance.

The following will give some idea of the maintenance accommodations provided and some of the methods followed by the Los Angeles Railway Automotive Equipment Department in the regular repairs and inspection of our automotive equipment.

Our equipment at the present time consists of 172 coaches and 131 autos and trucks of various makes and models, operating approximately eight million miles a year.

Very much in our favor is a strictly modern building, built especially to meet our particular maintenance requirements. This building was erected after a very careful study, by the management, of other operations and their service requirements and accommodations. Many ideas were incorporated in the construction of the building, which might not have been, had it not been for the courtesy of other operations.

In the repair shop there are 15 pits, each 3 feet wide and 75 feet

---

* *General Foreman, Automotive Equipment Dept., Los Angeles Railway Corp., Los Angeles, Calif. Mr. Rishel's article has been especially prepared for this publication, from an address which he made at a recent S.A.E. Meeting in Los Angeles, Calif.*

long, and a space of 12 feet between pits. Each pit is long enough to take care of two of the longest units of equipment we have, at the same time. Each of these pits is accessible at the south end by stairs in the end of the pit, and at the north end they merge into an inter-communicating pit which runs the entire length of the repair shop.

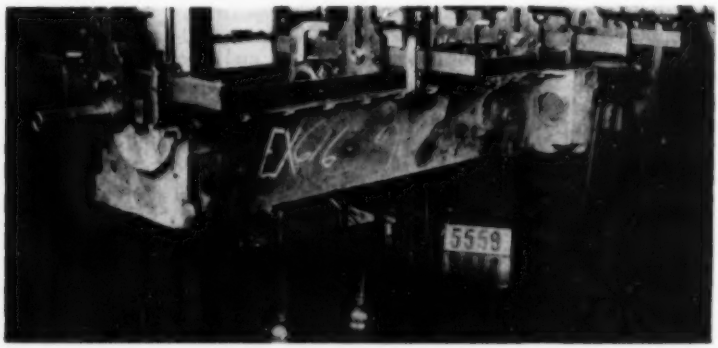
This pit is equipped with workbenches and grinding wheels and may be entered from the main floor by stairs at intervals of every other pit, or in other words, every 30 feet. Each repair pit is constructed with recesses in the sides, small ones to contain permanently attached light cords, and larger ones to be used by mechanics for tools, jacks or any small equipment they may desire to keep close at hand. We find that this helps to a great extent to eliminate the inconvenience occasioned by running over tool boxes and other small equipment.

Coaches, when pulling in off their runs are immediately filled with gasoline and water, and the oil level in the motor and air compressor checked. They are taken from here over a repair pit and given a safety inspection, which consists of checking such items as fan belts, water leaks, headlights, all body lights and buzzers, ignition wiring, brake adjustment, chassis springs, etc. In this process, many items are found and remedied, which if allowed to go on would soon develop into something more serious.

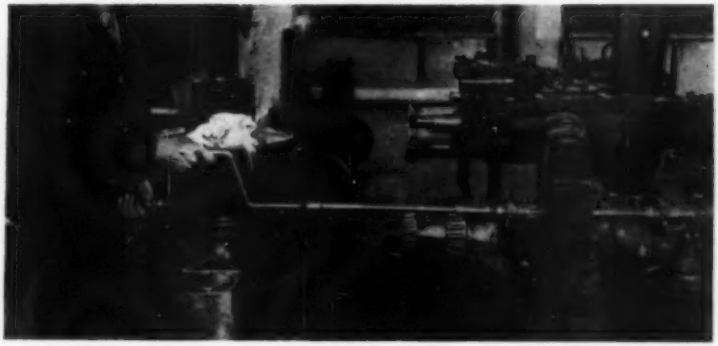
Before the coaches are again put on the road, the windows are cleaned by the use of a squegee, using clean water and drying with a rubber wiper. The floors are cleaned with compressed air and the seats dusted.

The brakes, being one of the all important problems in the transportation field, are periodically checked on a brake testing machine for pressure and equalization. We also have a chassis dynamometer on which various power and friction loss tests are made.

The auto and truck units being operated more or less by the same individual at all times, we depend



This line-boring machine is a "home-made" device, built to handle long motors with big bearings.



A good home-made line-reaming device for reaming out the brake-cam and slack adjuster bushings.

largely on him for information as to the condition of the equipment, except what we find at the regular lubrication and inspection period of 500 miles, this basis being used for all our equipment.

All of our lubrication is done with hand guns. We believe this method is just as efficient and more economical than the automatic system.

For the general condition of our motors, we depend on our records. In our coach maintenance we use the unit replacement system insofar as it is practicable. I mean by that, where the number of units in service will justify the expense of carrying a spare unit; generally speaking we use ten coaches as that basis.

Radiator maintenance presents a problem, peculiar in many respects, depending on the construction of the radiator. For instance, when the top tank is made of cast aluminum, the water has some action which gradually eats away the aluminum, to the extent that it eats through the tank, and at the same time deposits the particles of aluminum in the tubes or core. This action has been taken care of by fitting a brass liner on the inside of the aluminum tank, thereby preventing the direct contact of water and aluminum.

Electrical units are kept in condition by men who do only electrical work. Carburetors are handled insofar as is possible by one man. For removable cylinder head jobs we have made a device which mounts in the radiator filler neck, on a swivel mounting and acts as a fulcrum when attached to the head, which can easily be lifted and swung around to a special bracket that we mount on the bumper, to receive the head, thereby eliminating the accident hazard presented as well as saving the finish of the fenders when the head is rested on or lifted across them in the process of removing or installing.

When necessary to replace a cylinder block, we get a block exchange when possible and thereby maintain a standard size, at a cost almost comparable with a regrind.

Connecting rod bearings are fitted to the rods, bored by machine and filleted before being put in the motor. Due to the length of our motors and the size of their main bearings, we were unable to find a line reaming machine on the open market that was suitable for the work at a reasonable price, with the result that we made our own line boring machine.

Some trouble was encountered in removing the clutch shaft pilot bearing from the flywheel, for this job we made a puller, similar in appearance to a wheel puller, except that the center bolt, instead of being solid, is hollow and has an expanding device for reaching the bearing.

Transmissions and differentials are lowered or raised as the case may be, by a lift, also made by ourselves. This lift is mounted on four flanged rollers which are so spaced as to fit the width of the pits, the center of gravity being about two feet below the surface of the floor and the lifting mechanism consisting of a bevel gear and pinion operated by a hand crank which in turn works a screw which has a platform mounted on top to hold the unit. This can be rolled to whatever location is desired on the pit.

On our universal joints we are using a casing that has recently been developed, which seals the grease so efficiently that the period of lubrication on joints can be set at several thousand miles if desired.

The brake operating mechanism on the rear axles presented quite a problem to us for a while in the way of lining up the brake cam and slack adjuster bushings, until we made a line reaming device by taking an expanding reamer, cutting off the shank at the end of the threads and making a pilot bar to screw on each end, with an expanding pilot to slip on the bar and expand in the bushing opposite the one being reamed. The job is now not only faster but better.

When necessary to remove a complete front or rear axle assembly to be worked over, we have made stands on which they may be rigidly mounted and held there during

This rear axle stand was made right in the shop.

Answers the Question—

When should Spark Plugs be changed?

The

Defiance

SPARK PLUG TESTER

Why not have definite, accurate information on the condition of the spark plugs in your fleet units as a basis for replacements? Such a procedure increases operating efficiency and reduces chance of complete failure on the highway. The Defiance Spark Plug Tester is a proved, efficient device for testing plugs under compression. See that it is used in your own shop or by the garage servicing your fleet.

For full information, address:

DEFIANCE SPARK PLUGS, INC., 330 - 20th Street, Toledo, Ohio.

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Transmissions and differentials are raised and lowered by this lift, also made in the Company's own shops.

the working period. The one for the rear axle was made of an old brake drum mounted on a suitable base, and the one for the front axle being a double clamp arrangement with a similar base.

Under ordinary conditions our coaches are washed once a week, varying from this of course under adverse weather conditions or any other unusual occurrence. The bodies of our coaches are completely overhauled and painted once every two years. The overhauling of our autos and trucks varies of course with the type of service in which they are used.

A leak which was steadily growing has been overcome by providing a small cotterpin container which is attached to the mechanic's tool box where the commonly used sizes of cotterpins and lock washers are kept, thus saving time of running to the storeroom for the right size as well as eliminating the loss of cotterpins and lock washers through careless handling.

Over-head we have two 5-ton traveling electric cranes, hand controlled from the floor. It would be practically impossible to get along without such equipment as this, considering the class of work we have to handle.

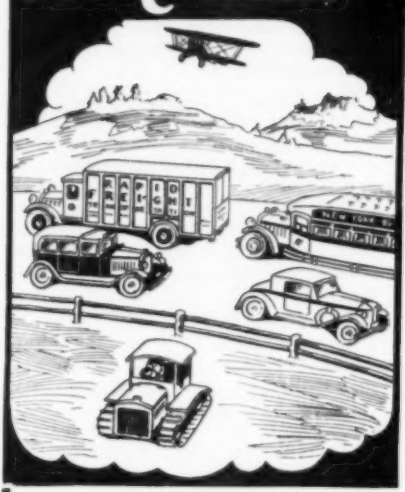
At the east end of the building we have the machine shop, where most of the spare units are overhauled, and all the minor machine work done (major machine work being done at the main railway shops). Here we have a machine for running-in our spare air compressors, and if necessary the checking of transmissions for noise or misalignment.

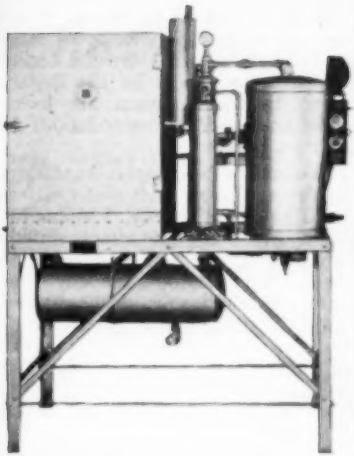
Next our electrical room, where spare electric units and batteries are overhauled or repaired. We also have equipment for testing electric units.

Next the dispatcher's or foreman's office, from where the coaches are allotted to their various runs, with a clerk in attendance to receive any road calls from equipment in service.

Note the cotter-pin container, attached to the mechanic's tool box.

YOUR FLEET Correctly Lubricated





Hundreds of Fleet Owners

have realized the advantages of owning a Skinner Oil Reclaimer. Not only have they effected huge savings in operating and maintenance costs, but the actual saving on oil alone has soon absorbed the cost of the Reclaimer.

There is a model to take care of your particular requirements.

SEND FOR COMPLETE INFORMATION—USE THIS COUPON

SKINNER MOTORS, INC.

Pioneers in Oil Reclamation

2231 DALZELLE ST. DETROIT, MICH.

Please send by return mail complete details regarding the huge savings effected by the SKINNER Oil Reclaimer.

NAME .....

ADDRESS ..... *CITY* ..... *STATE* .....

Servicing 303 Vehicles

(*Continued from page* 16)

Next is the store room where some seven thousand items of stock are carried on hand. On the second floor are the offices of the department. In the basement are locker rooms and other accommodations for the men.

This entire building is kept thoroughly scrubbed and clean at all times, and by the way, I think this has a psychological effect on the men as you will find comparatively few in dirty clothing at any time.

On the south side of the yard is the gas station, which has a storage capacity of 24,000 gallons of gasoline and 2,000 gallons of lubricating oil, these being delivered through flow meters which measure to the tenth part of a gallon.

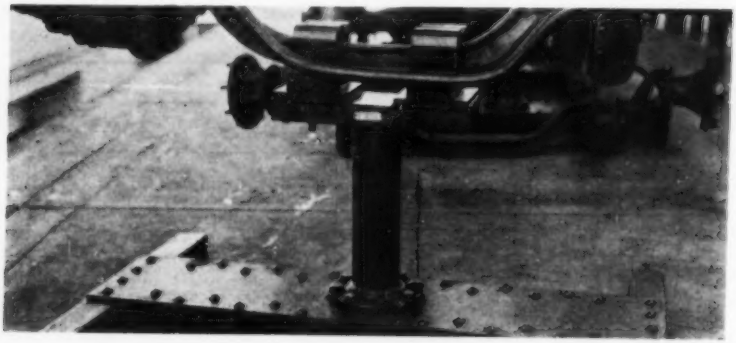
Next is the wash rack with a capacity of seven jobs at once, washing being done by high pressure water system, with facilities for mixing soap or any combination desired for cleaning.

Coach Transportation Increases

STUDIES made by the Transportation and Maintenance Division of the Society of Automotive Engineers reveal that the motor bus has been the fastest growing mode of transportation.

From 1917 to 1922, motor bus passengers exceeded 850,000,000. During the same period, the number of passengers carried by steam railroads showed a decrease of almost 100,000,000. The decrease in passengers traveling on steam railroads compared to a gain of 62,000,000 passengers reported for the period of 1912 to 1917.

From 1922 to 1929, the period of greatest expansion in bus lines, the increase in the number of passengers over a period of five to six years is 1,674,000,000, or a gain of almost 200 per cent. During the same time the steam railroads lost 92,826,473, and the surface electric lines more than 400,000,000 passengers. During the same period the number of passengers using all modes of transportation increased 1,500,000,000 over the previous five years.



Front axle stand which was also made in the shop.

VISCOSITY *must be known!*

VISCOSITY, commonly known as "body", is that factor in lubricating oil which enables it to maintain a constant, unbroken film (i. e. lubrication) between all moving parts.

When in the bottle all oils have given viscosity ratings. In the crankcase, however, operating conditions, heat, dilution and numerous other factors alter an oil's viscosity (i. e. lubricating value) to an extent where the operator can only guess whether or not his engine is being properly lubricated—there is nothing on the instrument board which can tell him.

Maintaining proper viscosity (i. e. lubrication) is not entirely a question of periodic oil changes or the adding of new oil to old. *It is a question of knowing continually while the motor is running, just what viscosity (i. e. lubricating value) the oil has in actual use, and only*

Visco-Meter Can Tell You

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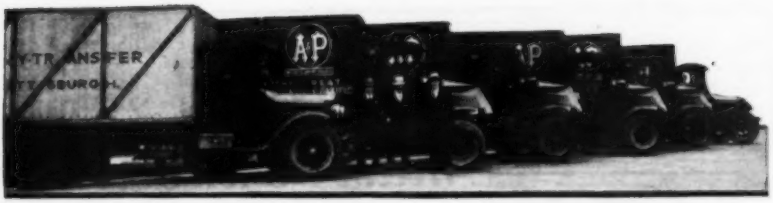

Good Wires *Save* Dollars

Joe Kenny Uses Better Quality Ignition Cable and Cuts His Wire Bill in Half

By F. D. Ewing

"YOU'D be surprised at the amount of money a fleet operator can save by studying the ignition cable he uses," says Joe Kenny, proprietor of the J. Kenny Transfer Company, operating over 200 trucks in Pittsburgh.

Joe Kenny is a shrewd business man who has built up for himself an enviable trucking business. Just recently he has contracted to do all the A&P trucking in the Pittsburgh district. His study of ignition cable is characteristic of his consideration of the little details which make for efficiency in any business.

"It was over a year ago," says Joe, "that we began to realize that there was a possibility of improving the ignition system on our trucks. We often had serious wire trouble that caused costly schedule delays, and we felt that our maintenance expenses—cleaning and replacing spark plugs, removing carbon, and replacing worn ignition wire—were entirely too great.

"We began to experiment. We got spools of wire from practically every wire manufacturer in the country. We made careful tests in actual service on our trucks. We were astounded that there could be so much difference in ignition cable. After months of experimenting we finally standardized on one brand."

"And has it made a difference in your costs?" Joe Kenny answered my question by taking me back and showing me actual records. They are now paying almost 50% more per hundred feet of ignition cable but their cost per truck is now less than half of what it was before!

"The wire we use," said Joe, "has to withstand intense sustained heat, because our trucks are running at least 22 hours out of every 24. We constantly check cables now and replace at the first sign of wear, but still our new, carefully selected wire gives more than twice the service. General maintenance costs have also been lowered.

"The hot spark delivered by good ignition cable tends to prevent fouled spark plugs and saves power. It helps prevent oil pumping and I am sure we get increased mileage. Since

(*Please turn to page* 26)

$500 in Gold FREE

Suggest a name for the remarkable NEW LEMPCO GROOVED AXLE

28 PRIZES

1ST PRIZE $200 · 2ND PRIZE $100
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Would you like to receive twelve and a half pounds of silver dollars ($200) free? Then come on—get in Lempco's $500 contest. You know axles. On the coupon below suggest a name for the new Lempco Grooved Axle Shaft. Then write a short answer of not more than 150 words telling "Why I Think A Grooved Shaft is Better Than An Ordinary Axle." A few minutes' quick thinking may win $200 for you. Contest is open to everyone in the automotive industry excepting Lempco employees. In case of tie, prize will be awarded to the first answer received. Submit as many names as you want. Letters must reach the Contest Manager not later than December 8th, 1931. Winners will be announced at the N. S. P. A. Show on December 9th. Write your names on the coupon below.

This Folder Will Help You. If you would like more complete details of the new grooved axle shaft, write for our new folder.

Note: In order to give everyone concerned an equal chance in this contest, the closing date has been extended to December 8th, 1931.

Send your entry today.

Contest Manager,
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Why They Stick

Lubrication Engineer Gives Us "Low-Down" on Physical Conditions Causing Sticky Valves.

By A. H. Frost*

A GUMMY deposit is sometimes found on the valve stems of internal combustion engines. This seriously interferes with the action of the valves and not infrequently makes it necessary to remove and clean them in order to obtain satisfactory operation.

Sometimes a change to a different brand or grade of lubricating oil seemingly alleviates the trouble; for this reason the cause of the deposit is often attributed to the oil. Such, however, is not true, for the trouble is not experienced with engines in proper mechanical condition.

Valve stem gumming is due to the temperature of the valve being increased above the normal to such an extent that it causes the oil to distill or stew down into a gummy mass. This action is accelerated where there is but a small amount of oil reaching the stem.

The tendency of various oils to gum under such conditions varies somewhat. This accounts for the fact that sometimes the use of a different grade or brand of oil will reduce these formations. Under normal conditions the temperature of the valve stems is considerably below that at which stewing of any oil will take place, but if this temperature is increased by any abnormal condition, gumming of the valves is likely to occur.

There are two major causes for the overheating of valve stems. First, the valves may be held open during the power stroke; second, lack of proper heat radiation due to the formation of scale in the water space around the valve seats may cause excessive temperatures.

Valves may remain open from a number of different causes. In new engines this condition usually arises due to insufficient clearance between the valve stem and its guide. Under this condition and owing to the natural expansion of the valve stem under heat, binding occurs in the guide, preventing the spring from closing the valve. This permits leakage of the burning gases past the

* *Technical Adviser, Vacuum Oil Company, Detroit, Mich.*

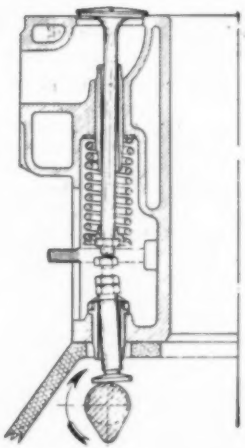
valves, causing severe overheating and the rapid gumming of any oil which may be present on the stems. This gum often prevents the valves from closing, even after the engine is stopped and the valves thoroughly cooled.

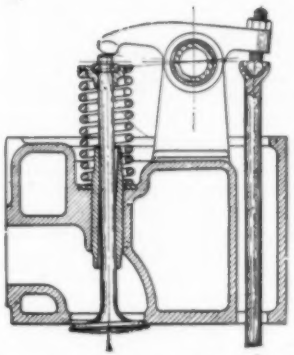
In both new and old engines, the valves may be held open by too close adjustment of the valve lifters. It is a common occurrence for mechanics to adjust the lifter to a closer clearance when the valve mechanism becomes noisy. Through a desire to secure extremely quiet operation, the lifters are usually not given sufficient clearance to allow for the normal elongation of the valve stems when they become heated. Consequently, when the engine is warmed up, leakage occurs and the temperature of the valve stems is thereby increased to such an extent that gumming takes place.

In engines which have seen considerable service, the valve stem guides are often badly worn and the clearance, between the valve stems and guides greatly exceeds that originally allowed. Owing to this greater clearance, some of the heated exhaust gases find their way between the stem and guide, thereby raising the temperature of the stem and baking the oil thereon into a mass which gradually accumulates and causes the valves to stick in their guides.

Sometimes gumming either in new or worn engines is accompanied by rusting or corrosion of the valve stems. In such instances the gumming trouble begins after this action has set in. This difficulty is the result of cold operation of the engine, particularly with fuels rich in sulphur compounds. It is usually encountered in cold weather.

Moisture condensed from the gases blowing by into the crankcase collects in the valve chamber and on the valve stems. Rusting sets in





Where valve-stem guides are badly worn, hot exhaust gases find their way between stem and guide, raising the temperature of the stem and baking the oil thereon into a mass which gradually accumulates and causes the valves to stick.

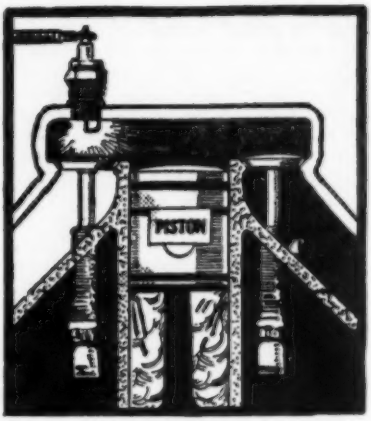
and will be accelerated if the moisture is slightly acid from the presence of sulphur compounds in the blowby gases. This condition interferes with the proper action of the valves and causes them to overheat, thereby turning any oil present on the stems into gum.

Engines in good mechanical condition as regards valve stem clearance and valve lifter adjustment, sometimes develop trouble from valve gumming after they have been in service for a considerable period of time. In cases of this kind, which usually occur in warm weather, the difficulty can usually be attributed to an accumulation of sediment or scale in the water jacket space around the valve seat which prevents the cooling water from sweeping the metal at this point. This scale or deposit is due to the presence of dirt or alkalis in the cooling water.

Since the temperature of the valves is dependent to a great extent upon the heat dissipated through the valve seat, any obstruction to the heat-flow at this point causes an increase in the temperature of the valve stems. As the deposit builds up, the temperature of the valve stems gradually increases until oils which were satisfactory when the engine was new, apparently cause valve gumming.

Defective design of the cooling system, valves, etc., are other causes of valve gumming, but they are so seldom encountered by service men, that there is no need of discussing them.

From the foregoing explanation of the causes of valve gumming, the methods of preventing or eliminating this trouble are quite obvious. First, the valve lifter clearances should be those specified by the manufacturer; trouble is sure to follow if the adjustment is made closer



Although blow-by does not work directly on the valve-stems, moisture condensed from the gases will collect on the valve-stems and other valve-chamber parts.

in an attempt to secure extra quiet operation. Correct adjustment will not only eliminate a great many cases of gumming but also numerous complaints of spark plug fouling, oil pumping, missing and loss of power.

In new or rebuilt engines, if gumming occurs, the valve stems should be polished with emery cloth and the guides reamed out to standard size. In the absence of proper reamers, the stems may be reduced in diameter slightly by continuing the polishing operation, but the guides should be thoroughly cleaned of all gum.

When gumming develops in worn engines where the valve stems are loose in their guides, new guides and valves should be fitted with the proper clearances. If the valve stems appear to be rusted, precautions should be taken to operate the en-

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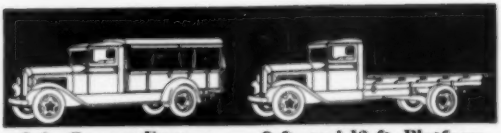

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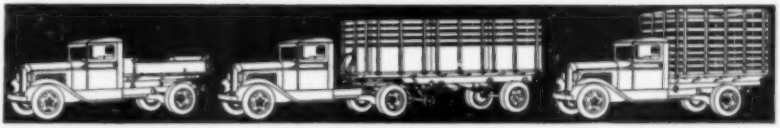

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Why They Stick

(*Continued from page 24*)

gine as warm as possible and to drain the crankcase oil at frequent intervals in order to avoid the condensation of moisture in the crankcase.

Another cause of sticking valves, or perhaps sluggish action of valves is the valve-springs. After continued use under varying temperatures, the steel in valve springs loses a certain amount of its "springiness." This, together with a gummy deposit of burned oil residue between stem and guide, will seriously interfere with the proper valve action; at least the maximum in performance can not be expected when springs are weak.

It is suggested therefore, that whenever valves are ground the springs be tested for tension and replaced when they show the slightest signs of weakness. The illustration accompanying this article graphically portrays our suggestion. It is a drawing made from an actual set of valve springs removed from the engine of a popular car after a few years of service had been rendered.

Should any additional questions arise on the subject of sticky or sluggish valves, we shall be glad indeed to answer them through this publication. (Editor's Note: Inquiries can be addressed to Mr. Frost, or to the Editor of the Trouble Shooter's Department.)

Weight Vs. Capacity

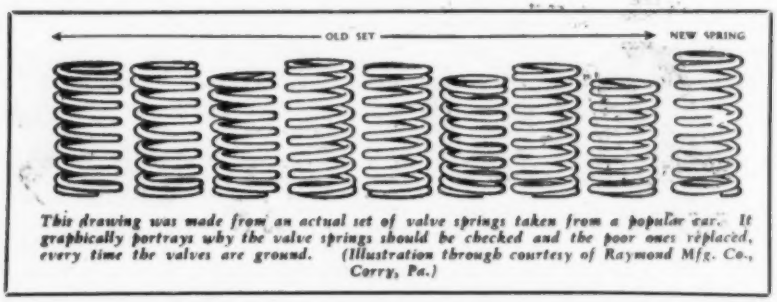
"SINCE there is a direct relationship between truck weight and carrying capacity, a well-balanced chassis should be able to carry a certain number of times its own weight. This relationship might well be recognized in fixing truck ratings."—*M. L. Pulcher, President, Federal Motor Car Company, Detroit.*

Good Wires Save Dollars

(*Continued from page 20*)

we have been using the new wire, we have not had a single truck stalled on the road because of wire trouble."

Service foremen will do well to consider the savings effected by an equally careful study of the small items like ignition cable. In the end they certainly make a difference in the profits, as Joe Kenny has conclusively proved in his experiments and in a year's actual operation.



This drawing was made from an actual set of valve springs taken from a popular car. It graphically portrays why the valve springs should be checked and the poor ones replaced, every time the valves are ground. (Illustration through courtesy of Raymond Mfg. Co., Corry, Pa.)

Servicing B. & B. Clutches

Maintenance Hints on Two More Types of B. & B. Clutches are Given by Factory Service Man

By C. C. Blanchard

AMONG the common jobs brought to the fleet service shop is that of clutch adjustment and replacement. But many are the mechanics who do slipshod work—not because they want to, but because they do not know the most efficient means of handling clutch jobs.

Unless the clutch is adjusted or parts replaced exactly right, the driver will find it necessary to bring his machine back into the service shop within a few days. Nine times out of ten it will be because the work was done improperly in the first place.

One of the most widely used clutches is the single plate dry disc type such as is made by Borg & Beck Co., and the information contained herein is confined to Borg & Beck adjustable types that carry the designating symbols which end in "X" and "Y."

All parts of this clutch are locked to the flywheel and rotate with it when the clutch is engaged, except in those models having a release bearing cup (11 in Fig. 1), which is prevented from turning by the pedal shaft release fork. The release bearing and sleeves (8 in Figs. 1, 2 and 3), the shaft, and driven plate (2 in Figs. 1 and 2) come to rest when the clutch is released. The sleeve is prevented from turning on the shaft by a key operating in a keyway cut the full length of the sleeve, which allows it to slide along the shaft.

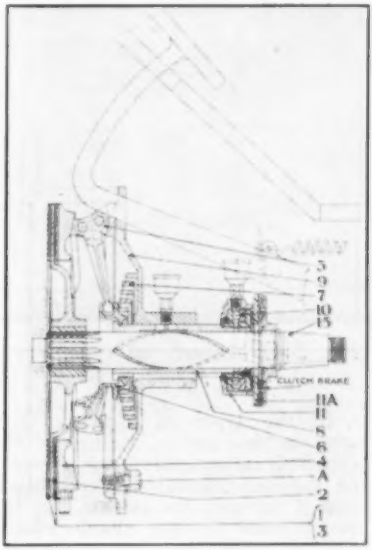


Fig. 1—Cross-sectional view of the "X" and "Y" types.

The "Y" types differ from the "X" types only in the details of sleeve construction. Instead of a nut being screwed on the rear end of the sleeve, a lock wire in a groove at the forward end of the sleeve holds the retractor collar bearing in place. (See Figs. 1 and 3).

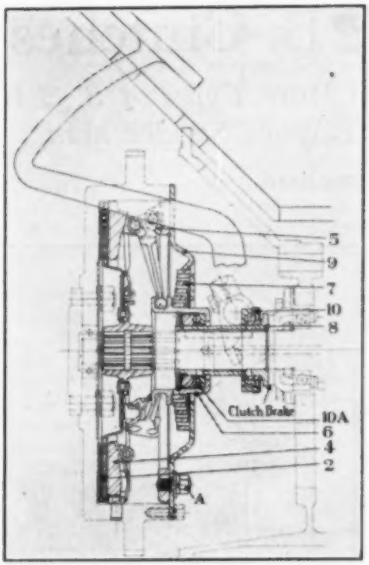


Fig. 2—Cross-sectional view of another popular type.

In the types of clutches dealt with in this article, release of the clutch is accomplished by pressure on the clutch pedal which is transmitted through the release fork on pedal shaft to the clutch release bearing. This bearing is mounted on the clutch sleeve (8 in Figs. 1, 2 and 3), which also carries on its forward end the retractor collar (6) and the retractor collar bearing (10A). This entire sleeve is thus moved to the rear and by that action compresses the spring and moves inner ends of levers to the rear. Where a clutch brake is attached, the sleeve assembly moves back until it comes in contact with the brake facing, which is located at the extreme released position.

In all Borg & Beck clutches of adjustable types, the outer ends of the three levers bear against the cam surfaces of the pressure plate.

As clutch facings wear, the thrust ring, or pressure plate, moves closer to the flywheel face and the outer ends of the levers follow. This causes the inner ends of the levers and the release sleeve to travel farther toward the flywheel. The effect of this on the clutch pedal is to decrease clearance under toe board before it begins to release the clutch. Proper clearance must always be maintained. Clutch adjustment is provided to compensate for facing wear and by adjusting as will be directed shortly, the three levers move higher on the three cams and bear at thicker sections on the pressure plate. Thus the sleeve travel is decreased and the pedal clearance under the toe board is increased.

It is important to understand that compensation for facing wear should be taken care of by adjusting the clutch, rather than the clutch pedal.

In addition to the clutch adjustment, all cars provide one or more adjustments on the pedal and pedal shaft and if these have been tampered with, they should be first set in accordance with instructions supplied by each car manufacturer. In general proceed as follows:

For types DXY, RGY, DX, GX, RGX, 13 FX, and FJX with clutch brake, push pedal down as far as it will go and note whether rear end of sleeve comes in contact with clutch brake. (Figs. 1 and 3). If it does not, by reason of the pedal resting against toe board, change pedal adjustment, raising the pedal enough so that it will not rest against toe board.

For types DX, GX and RGX without clutch brake, push pedal down as far as it will go so that

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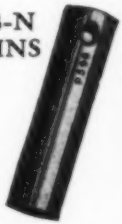

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¶ On page 35 is a form, ready to be filled out. Maintenance men are urged to co-operate in joining this new form of "club."

¶ In order to become a "member" it is simply necessary to participate in these questions and answers, only when you choose to do so, of course. There is *no* fee, *no* dues and no limitations.

¶ We would like to see every reader join. See pages 34-35.

The Editor

PROFIT LIFTERS

The fastest, simplest tool ever designed for removing and replacing the 2-piece valve keepers on modern "low port" motors — K-D No. 603 Valve Spring Lifter Set.

THE K-D MANUFACTURING CO., Lancaster, Penna.

pedal pad rests against toe board and note position of retractor collar (6). The rear face of it should be about flush with the clutch cover (9). (See Fig. 3). If it is not in this position change pedal adjustment either raising or lowering the pedal enough to bring the retractor collar to that position.

The pedal adjustment should not be touched again because adjusting the clutch automatically restores clearance under toe board.

Loosen adjustment bolts (A in Fig. 4). Types 13 FX and FJX have three adjustment bolts, all others have two.

As these bolts are screwed into the same mounting ring, moving one bolt also moves the other.

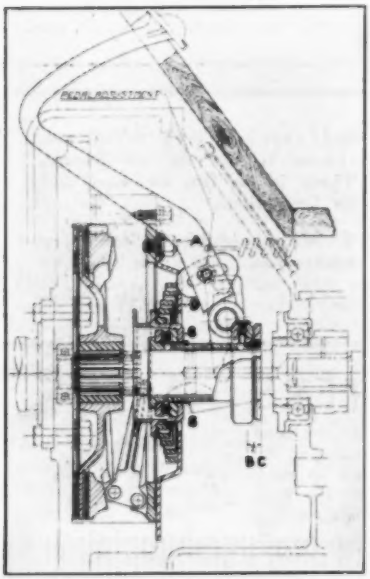


Fig. 3—Still another type of clutch in cross-section.

Hold clutch pedal down. Move either bolt (A) to the right, or clockwise, about ½ inch.

Engage clutch by removing pressure from pedal and note distance sleeve (8 in Figs. 1, 2 and 3) travels. This should be as follows:

Types DX, DXY, GX, RGX and RGS—½ inch

Types GY, RGY, 13FX and FJX—5/8 inch

If sleeve travels more than the above distance, hold pedal down and move bolt (A) to right. If less than distance above mentioned, move bolt (A) to left. After the correct travel has been obtained tighten bolts (A). This completes clutch adjustment. When bolts (A) reach right ends of cover slots due to repeated adjustments, remove them one at a time and screw them into the repeat holes, which will then be exposed, at the opposite end of the slots. (See Fig. 4), thus doubling the range of adjustment.

To remove the clutch it is first necessary to remove the transmission assembly. After the transmission has been removed proceed to remove the clutch as follows:

1. For convenience mark the flywheel and the clutch cover with corresponding marks so that the clutch can be reassembled in the same position.

2. Obtain wood blocks, or other suitable material, to use as spacer between the release bearing and clutch cover, (15 in Fig. 1). These should be large enough so that the space is completely filled so as to release the spring pressure from the holding bolts.

3. Remove all holding bolts which will permit clutch cover assembly to be removed from flywheel.

4. The pressure plate remains in the flywheel and can now be removed, after which the dowel pins must be taken out in order to re-

move the driven plate assembly.

5. Further disassembly of the clutch cover assembly can be made by compressing the springs in an arbor press, or drill press, as follows:

The cover should be placed on two blocks with the spring up, applying the spindle to the end of the clutch sleeve. (See Fig. 5). The two blocks can then be removed and by releasing pressure gradually the entire sleeve assembly can be taken out. If the adjustment bolts are removed, separating the mounting ring assembly and cover, these two parts should be marked so that they will come back together in the same position.

6. Further disassembly of the sleeve assembly can be made as follows: In "X" type the flange nut, which is screwed onto the end of the sleeve, is held in place by two lock screws. These can be backed out with a suitable screw driver, after which the nut can be removed by placing the sleeve on an arbor with a key to engage the keyway in the sleeve and a spanner wrench with pins to engage in the holes in flange nut. When flange nut is assembled to sleeve be sure that it is pulled down tight against the shoulder and after lock screws have been inserted close up the holes slightly with a chisel so that the screws cannot back out. In "Y" types the sleeve assembly can be taken apart by first removing the grease retainer lock wire and grease retainer in the retractor collar, then press retractor collar bearing (10A in Fig. 2) to the rear on the sleeve until lock wire is uncovered and can be removed, then both bearings can be pressed off of sleeve. In assembling the reverse order is followed.

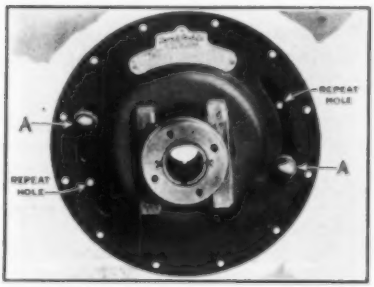


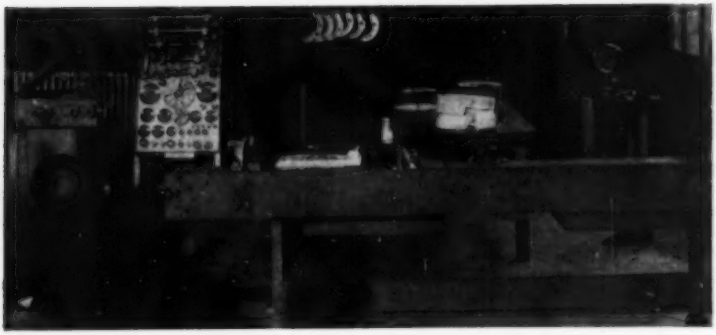
Fig. 4—Adjustment bolts and repeat holes are used.

Fig. 5—Compressing the clutch springs in arbor press.

Inspection of the clutch parts should include the following:

A. Facing Thickness: Facings should have a thickness of not less than *3/32* inch. If less than this amount new facings, or preferably new driven plate assembly, should be installed. The cost of a new driven plate assembly complete is so low in comparison to the labor cost in removing it that it is better in most cases to avoid the troubles incident to removing old facings and applying new ones. If the plate is bent or the facings incorrectly applied so that they do not lie flat the clutch may not release or may be so rough that it will have to be torn down again to correct the trouble, which would add expense far greater than the difference in cost between facings and labor applying them, as

(Please turn to page 65)



Solving Brake *Problems*

Brake Service "Institute" Converts Service Men Into Brake Experts at No Cost to Operator

By J. L. Badger

THE movement for surer and better braking mechanisms has been going on for a long, long time. Many attempts have been made to improve conditions causing directly or indirectly over 90 per cent of all automobile accidents.

One of these, which has proven its practical worth in several cities (Chicago, Los Angeles, Philadelphia, Detroit, Boston and New York) is known as the Multibestos Brake Service Institute, which is sponsored by the Multibestos Company of Cambridge, Mass. "Institutes" are maintained in these cities, operated usually in conjunction with the local distributor, which are in reality training schools and meeting places for maintenance men interested in getting together to discuss brake servicing problems. Its aims are to make available:

(1) *A source of information concerning the latest developments in braking mechanisms, brake lining equipment and materials.*

(2) *An opportunity to have the advice and training of experts on brake servicing, brake service merchandising, trouble shooting, cost control and shop management and arrangement.*

(3) *An efficient service organization for the relining and correction of troublesome brake shoes.*

Each Institute is headed by a thoroughly trained, technical brake servicing expert, who is available for consultation and for training, without charge, of any mechanic that is to be a specialist in brake servicing work.

The set-up and equipment of each Institute is thoroughly modern. It includes actual cutaway models of various types of brake mechanisms and charts showing the whole brake

Solving Brake Problems

(Continued)

systems with instructions as to necessary adjustments.

One of the functions of the Institute is to solve unusual brake problems and make the information available to the trade. Naturally, many of the problems apply to specific cars or brake mechanisms. A number of general suggestions have been brought out which are proving extremely valuable. For instance, there seems to be a general opinion that all internal brakes are of the expanding type, such as internal hydraulics. The idea of self-energizing action which is responsible for the wrap created in Bendix, Steeldraulic and other types of self-energizing brakes is not conceived. The practice of setting the adjustment too close causing loss of the energizing seems to be prevalent.

Another practice which is also common in installing moulded lining is a tendency to "burn in". This practice is a very poor one as it is very apt to cause drum scoring and invariably breaks down the efficiency of the lining.

Especial emphasis should be put on the shaping of bands for all external work. The major proportion of brake squeaks are due to bands not being properly shaped.

The first institute was opened in Chicago. Other Institutes are still running in Philadelphia, Detroit, Boston, New York and Los Angeles.

"What is this Multibestos Institute?" "How long has it been going?" "Is it open to fleet operators?" "How can we get in?"—these are but a few of the questions asked since these Institutes were started. If you are interested in becoming, or having your men become better brake mechanics, you are cordially invited to write to The Multibestos Company, 235 Harvey St., Cambridge, B, Mass., for full details and the address of the Institute nearest to you. There is no cost or obligation.

The picture above, as well as that on page 32, illustrate the thoroughness and forethought exercised in planning the brake service "institutes". Note the completeness of the equipment.

Here Are But a Few of the Many Answers to Question No. 12

(Please Respond to No. 14)

"On White busses in our service, new rings are usually installed after the first 25,000 to 35,000 miles. Engine reconditioning (reboring) is done on an average of every 90,000 miles. We do not cure oil pumpers and piston slap by the mere installation of rings. Quality brand piston rings are used for replacement, being purchased from jobbers."—*H. S. Sexauer, Shop Supt., Dayton Northern Utilities, Inc., West Milton, Ohio, operating a fleet of 2 trucks, 6 busses and 6 passenger cars.*

"New vehicles usually require ring replacement at about 30,000 to 40,000 miles. After this, it is usually necessary to recondition the walls (honing) on subsequent overhauls. We use Pedrick piston rings for all purposes, buying them through our jobber. Oil pumping and piston slap are the symptoms that call for a reconditioning job."—*C. Haines, Penn Dairies, Inc., Lancaster, Pa., operating a fleet of 41 trucks and 15 passenger cars.*

"The average mileage on new engines before ring replacement is about 25,000. When cylinders need reconditioning (about 35,000 miles) we regrind them. We use Richmond Hammered rings for all purposes, including the curing of oil pumping without reboring. Complete major overhauls are done every three years, or sooner if they need it."—*J. P. Burnette, Supt. M. V. E., Railway Express Agency, Cleveland, Ohio, operating a fleet of 81 trucks and 11 passenger cars.*

"On new vehicles we find it necessary to replace piston rings after 15,000 to 20,000 miles. Engine reconditioning is then done about every 25,000 to 50,000 miles, depending, of course, on the size and make of truck. Reboring and honing are the methods followed. We find that Perfect Circle rings (purchased from jobbers) give us best results in all kinds of reconditioning jobs. All motor overhaul work is done in our own shop."—*P. S. Vail, General Supt. of Trans., Langendorf United Bakeries, Inc., San Francisco, Calif., operating a fleet of 375 trucks.*

"After the first 25,000 miles we generally find it necessary to replace the piston rings. Simplex rings are used to cure oil pumping and piston slap. When we recondition engines by boring, grinding or honing, any standard piston ring seems to give good results. We buy rings from jobbers. We do this work annually, or when needed, there being no set period because it depends on the service rendered and our mileage is too varied."—*Jack Lehr, Supt. Arctic Dairy, Kansas City, Mo., operating a fleet of 45 trucks and 10 passenger cars.*

"New engines usually need rings after about 12 to 18 months, or an equivalent of 25,000 to 35,000 miles. After that we use the Storm method of engine reconditioning. Sometimes we replace piston rings only, to cure bad cases of oil pumping and piston slap. We use American Hammered rings in all cases, which we buy through jobbers. Our motor conditions vary very much, especially the trucks, as the working conditions are different."—*J. T. Latta, City of Durham Garage, Durham, N. C., operating a fleet of 36 trucks and 16 passenger cars.*

(Please tear out and mail to The Editor, The Fleet Owner, 90 West St., New York)

Question-of-the-Month Club

No. 14—Radiator Hose

What is the average life of radiator hose? .....

What is the most common cause of hose failure? (Please check below)

Separation of Plies? ..... *Swelling?* .....

Deterioration of outside cover by oil, grease and heat? .....

Collapsing of hose? ..... *Other causes?* .....

Has the use of anti-freeze affected your hose in the past? .....

In what manner? .....

What type of hose construction gives best service? (Please check below)

All rubber? ..... *3-ply fabric and rubber?* .....

5-ply fabric and rubber? ..... *Use of coil spring inside?* .....

Is it good policy to use old radiator hose that looks o. k. but might become defective on the road? .....

Is frequent inspection and tightening of clamps a factor in securing good hose service? .....

How often are these inspections made? .....

What can you suggest to prolong the life of radiator hose? .....

.....

.....

Shall we send a free sample of heavy duty radiator hose? .....

How many vehicles in your fleet?

.....Trucks; *.....Busses;* *.....Pass. Cars;* *.....Other types.*

Name of Firm .....

Address .....

City and State .....

Your Name .....*Position* .....

(Please tear out and mail to The Editor, The Fleet Owner, 90 West St., New York)

Keeping Accident Records

A Key to Accurate Fleet Accident Record Keeping That Ties in with Insurance Company Forms

By W. H. Cameron*

"BUT we don't have any accidents," the operator of a good-sized fleet of vehicles told me recently. I was skeptical.

Upon questioning him further, he admitted his fleet had suffered no *serious* accidents. An accident, in his opinion, was a crash in which a truck was smashed up or somebody was pretty badly hurt.

He couldn't tell me what his accidents were costing, per month or per year. Repair bills were approximately so much—insurance premiums and claims hit a certain total—but he hesitated even guessing the total accident bill.

This same fleet operator had come to me asking help in outlining an accident prevention program for his fleet. It was not until I had pointed out that he must know the *causes* of his accidents before he could do an intelligent job of preventing their repetition, that he realized the importance of careful and accurate accident records. Records giving *all* the information upon every accident, no matter how trivial.

Here was a good question however, that he brought up:

"I am a business man," he explained, "I am busy. I have all the responsibilities squarely upon my shoulders. If I want something done right, I have to do it myself because my company is not big enough to employ a lot of high-powered executives.

"I have a man in charge of my fleet and drivers, true, and I have clerks to take care of routine reports and the like, but I have neither the man to take over the single task of accident prevention work, nor the money with which to hire such a man.

"Your idea of keeping careful records is entirely right—but what about the employer like myself who can't keep a lot of charts and reports? What are we to do?"

It was a pleasure indeed to answer this question by handing him a complete outline of a method of accident reporting that not only would give him as complete a check upon his accident experience as is obtained by the largest companies with whole departments devoted to the task, but a plan that simplified the system he was then using.

Repeated demands by fleet operators for just this sort of help told the *National Safety Council* that this particular operator's problem is a common and frequent one. As a consequence, the Council has just published a Safe Practices Pamphlet which incorporates the methods given in the specific case related.

"Commercial Vehicle Accident Statistics—How to Keep and Use Them" is the title of this new guide to accurate record keeping and the *National Safety Council* will send a

(Please turn to page 39)

* *Managing Director, National Safety Council, Chicago, Ill.*

VEHICULAR ACCIDENT REPORT

Accident Number: 1-13

Date of This Report: 1-9-31.

Company J. M. White and Co. Address 1700 N. Madison, Chicago

(If sufficient space for any of your answers is not provided on this form, please complete such answers on sheet of plain white paper and attach to this report.)

Company Vehicle in Accident

Make Reo Type of Body Truck Motor No. 43607-M License No. 121-761 Ill.

Years Operated 2 Mileage Operated 20,500 Capacity 2 ton

Driver's Name George Stiver Address 1900 W. State Age 32

Time and Place of Accident

Date 1-9 1931 at 3:30 ~~A. M.~~ P. M. On Madison (Street or Rural Highway)

At Jackson (Intersecting street, house number, or highway location.) In Chicago (City or County) Ill. (State)

Check X One Which Was Also Involved

a. Pedestrian	☐	d. Electric Car	☐	g. Fixed Object	☐
b. Other Motor Vehicle	☒	e. Bicycle	☐	h. Non-Operating	☐
c. Railroad Train	☐	f. Horse Drawn Vehicle	☐	i. Non-Collision	☐

Who Was Injured?

	NAME	ADDRESS	AGE	SEX	FATAL	NON-FATAL
1.	No one hurt					
2.						
3.						

Injured Taken To: By

Name of Doctor Called Address

Who Was the Other Driver?

Name Harry Gustafson Address 7100 W. Clark, Chicago

Make of His Car Buick Model Sedan Motor No. 145678

His License No. 199-880 His Driver's License No. None

What Damage Resulted?

To the Other Vehicle or Property Smashed radiator and fender

Estimated Cost $ 50.00

To Our Vehicle Smashed running board and door and broke windshield

Estimated Cost $ 25.00

Who Saw the Accident?

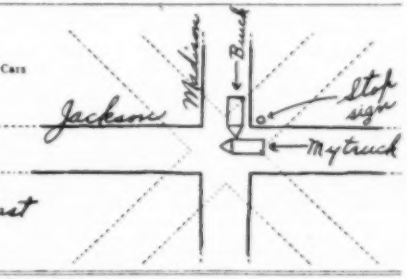
	NAME	AGE	ADDRESS
1.	Mrs. August Beck	50	2100 W. Jackson, Chicago
2.	Gerald Matson	21	4817 W. Austin, " "
3.	Gilbert Smith	18	1800 N. Davis, Evanston

Policeman Present?

Name None Badge No.

Indicate on This Diagram What Happened

1. Draw Heavy Lines to Show Streets.
2. Enter Street Names and House Numbers.
3. Show Directions of Travel.
4. Show Point of Collision and Position of Cars Before and After Accident.
5. Show Important Measurements.



(Fill Out Reverse Side)

Figure 1 (Front side). The driver fills out this form either at the scene of the accident or immediately upon his return to the garage.

CIRCUMSTANCES INVOLVING VEHICLE AND DRIVER
(Check with X Each Item That Applies)

	Vehicle	
MOVEMENT OF VEHICLE	Our	Other
a. Turning right		
b. Turning left		
c. Going straight through	X	X
d. Slowing down or stopping		
e. Backing		
f. Parked or standing still		
g. Skidding		
h. Rear-end collision		
ACTION OF DRIVER		
a. Exceeding speed limit		X
b. On wrong side of road		X
c. Didn't have right of way		
d. Cutting in		
e. Passing standing street car		
f. Passing on a curve or hill		
g. Passing on wrong side		
h. Failed to signal		
i. Improper turning		
j. Failed to observe stop sign	X	
k. Disregarded officer or signal		
l. Disregarded slow or warning sign		
m. Drove off roadway		
n. Drove through safety zone		
o. Double or prohibited parking		
CONDITION OF DRIVER		
a. Intoxicated		
b. Physical defect		
c. Asleep		
CONDITION OF VEHICLE		
a. Defective brakes		
b. Improper lights		
c. Defective steering gear		
d. Tire puncture or blowout		
e. Other defects		

OTHER CIRCUMSTANCES OF THE ACCIDENT
(Check With X Each Item That Applies)

LOCATION ON HIGHWAY	
a. At intersection	X
b. At R. R. crossing—unguarded	
c. *Same*—guarded by watchman or gate	
d. *Same*—guarded by automatic signal	
e. At bridge or underpass	
f. On curve	
g. On hill	
h. On straight level road	
i. Other	
ROAD SURFACE CONDITIONS	
a. Dry	
b. Wet	X
c. Muddy	
d. Snowy	
e. Icy	
ROAD DEFECTS	
a. Road under repair	
b. Obstruction not lighted	
c. Other	
WEATHER CONDITIONS	
a. Clear	
b. Cloudy	X
c. Fog	
d. Rain	
e. Snow	
LIGHT CONDITIONS	
a. Daylight	X
b. Dusk	
c. Darkness—no street lights	
d. Darkness—good street lights	
e. Darkness—poor street lights	
ACTION OF PEDESTRIAN	
a. Crossing at intersection with signal	
b. *Same*—against signal	
c. *Same*—no signal	
d. *Same*—diagonally	
e. Crossing between intersections	
f. Playing or working in street	
g. Riding or hitching on vehicles	
h. Getting on or off street car	
i. Not in roadway	
j. Other	
CONDITION OF PEDESTRIAN	
a. Intoxicated	
b. Physical defect	
c. Confused by traffic	
d. View obstructed	

Add any other details here: I was driving west on Jackson and forgot there was a stop sign at Madison. It was cloudy and I couldn't see the sign very well. Just as I got into the intersection the other car hit me!

Hours you were on duty before accident? 8 Years in employ of this company? 2

How many accidents have you had while in our employ? 1 How many this year? 1

Countersigned James Blackstone (Name of Superintendent or Supervisor)

Driver's signature George Stiver

Chauffeur's or Driver's License No.

Figure 1 (Reverse side). Check marks made by the driver tell the complete story of the accident. (Actual size of form 8½x11 inches.)

Keeping Accident Records

(*Continued from page 36*)

copy without charge or obligation to any fleet operator or reader of *The Fleet Owner* upon request. The interest of the Council in publishing and distributing this study and the accident report forms, is first to enable the operator to learn his accident causes and thereby intelligently plan his preventive work, and secondly to obtain a national uniformity of accident record keeping by fleet operators. If the same style of records are kept throughout the country and the experience reported to Council statisticians, then the *National Safety Council* will be able to determine the principal causes and effects of accidents among trucks, buses and taxicabs and recommend further measures for employers to take to prevent them.

Studies of this sort will tell:

1. *What type of accident occurs most frequently.*
2. *Where most accidents happen.*
3. *What actions of drivers are involved in most accidents.*
4. *What conditions of road, the weather, or light, figure most prominently in accidents.*
5. *What personal injuries or property damage result from accidents.*
6. *What should be done to eliminate the causes.*
7. *What reductions have been made in outstanding causes.*
8. *Which employees are accident prone.*

The new Safe Practices Pamphlet No. D-4, *"Commercial Vehicle Accident Statistics—How to Keep and Use Them"* explains the set-up of an accident reporting system and how to record all accidents properly upon two forms provided by the Council. These forms are the *"Vehicular Accident Report"* and the *"Vehicular Accident Record Sheet."*

The *"Vehicular Accident Report"* is a form to be filled out by the driver and gives complete information, including not only the standard items of insurance company forms, but significant features of other forms designed mainly for accident prevention purposes. It contains such items of legal significance as the names of persons injured, names of witnesses, and license numbers; a diagram to show the position of the vehicles at the collision point; and other data required by insurance companies to fix responsibility.

It is anticipated that the insurance carrier will ordinarily be willing to accept reports on this form in lieu of the regular company form. In fact, several of the leading insurance companies have indicated their willingness to do this and the National Bureau of Casualty and Surety Underwriters has recommended to its members that the form be accepted.

This will eliminate duplication of effort and the company will be able to get all needed additional information upon accident causes with scarcely more effort than is now usually put forth in reporting accidents to the insurance carrier.

The *"Accident Record Sheet"* is a large control form, one of which ordinarily will take care of a fleet of 25 to 40 vehicles for three months. This sheet condenses all fleet accident experience on a single page and permits summarizing and analyzing whenever a report is wanted by the management.

A third form also is provided, the *"Vehicular Accident Summary Report."* It is an aid to frequent summaries of periodical experience and

(*Please turn to page 40*)

Keeping Accident Records

(*Continued from page 39*)

one copy can be sent to the *National Safety Council* for comparison with other fleet records. Such a comparison is mutually beneficial to the individual fleet and the Council since the fleet can determine if its record is in line with the records of other fleets and the Council can study the experience of the group for general conclusions.

This standard accident reporting system is a development of the activities of the Council's Delivery Taxicab and Bus Section, an organization of more than 500 fleet operating members of the *National Safety Council*, and great care was taken to assure the simplicity of the system so it would make record keeping less complicated and more readily understood.

EMPLOYEE ACCIDENT RECORD

Name E. Stiver Division Central

No. 35 Date Employed 1-5-29

Accident No.	Date	Month	Day of Week	Time of Day A.M. or P.M.	REMARKS
1-31	1-31	PD	AS	M Y	Other driver speeding

Figure 4 (Front side). A card like this for each employee makes it easy to discover where safety education is most needed.

MILEAGE RECORD

Month	1931	1932	1933	1934	1935
Yearly Total					
January	2431				
February	2215				
March	2505				
April	2752				
May	2467				
June					
July					
August					
September					
October					
November					
December					

Figure 4 (Reverse side). Mileage figures for each employee are necessary in contests and the totals on cards like these may be added to get a grand total for the company.

Operators Encourage Safety

TRACING the trend toward better motor truck driving, C. A. Tilt, President of the Diamond T Motor Car Company, quotes authentic figures just compiled indicating remarkable developments along this line.

"A questionnaire sent to the nation's large motor truck owners brought responses from 2,099 fleet users operating a total of 70,644 vehicles to the effect that 98 per cent of them are doing something to encourage better driving."

"Their efforts take on various forms. For instance, 85 per cent are penalizing poor performance, 56 per cent rewarding good performance, and 84 per cent instructing new drivers. Seventy-four per cent of their trucks are operated by drivers selected by prescribed qualifications, and 67 per cent are actually operated under driver training systems.

"The results are dramatically told in figures showing that accidents have been cut down to a basis of only one in every 16,273 miles covered by the trucks. In some cities, where the safety work is most intensively carried on and enlists the nearest to 100 per cent co-operation among truck users, the records are even more favorable.

"When we consider that concerted campaigns to improve truck driving nationally are of fairly recent origin, the progress made in a brief time is really amazing. All credit is due chambers of commerce, safety councils and trade bodies in and out of the motor truck industry which have joined in encouraging better driving. The good effects are reflected not only in fewer accidents in which trucks are involved but also in greater care and courtesy on the part of the drivers."

VEHICULAR ACCIDENT SUMMARY REPORT

Compiled for

National Safety Council, Inc., Civic Opera Building, 20 North Wacker Drive, Chicago, Ill.

Company T. M. White and Co. Period Covered 9-15-30 to 3-31-31

Address 1700 N. Madison, Chicago Date 4-1-31

Person Making This Report J. B. White Title Vice-Pres.

Use a Separate Sheet to Report Each Type of Vehicle Operated

Type of Vehicle Covered by this Report Trucks
(Taxicab, Bus, Passenger Car, Truck, Electric, Horse-drawn)

Nature of Business Transfer and trucking
(Laundry, Taxicab, Bakery, Freight, etc.)

TABLE I—ACCIDENT RATES

1. Average Number of Vehicles of This Type in Regular Operation During the Period. (If the number of vehicles operated varies in different months, add the number in regular operation for each month during the period and divide by the number of months.) See Note 1, below.	41
2. Total Number of Vehicle-Miles Operated During the Period. (If possible, calculate from actual mileage records of all trucks. Otherwise, multiply the average number of vehicles in operation by the number of working days during the period, and then multiply that product by the average number of miles vehicles operate daily.)	650,520
3. Total Number of Accidents All Types. See Note 2, below.	24
4. Number of Accidents per 100,000 Vehicle-Miles. (Multiply Item 3 by 100,000 and divide by Item 2.)	3.69
5. Number of Vehicle-Hours Operated During the Period. (If possible, enter this item in addition to Item 2.)	67,665
6. Number of Accidents per 100,000 Vehicle-Hours. (Multiply Item 3 by 100,000 and divide by Item 5.)	35.47

Notes on Table I

1. Item 1, as indicated above, should include vehicles of only one type. Other sheets should be used to report all mechanically **propelled** or horse-drawn vehicles operating on streets and highways, whether used in carrying goods, employees, or the general public.

2. A Vehicular Accident for this report shall be:—Any accident in which the vehicle is involved, whether in motion, temporarily **stopped**, parked, or being loaded or unloaded, which results in (1) Death, (2) Other Personal Injuries (no deaths), or (3) Property Damage Only, regardless of who was hurt, what property was damaged, or who was responsible.

Accidents to mechanics in company garages are not reportable. Thus, a crankcase crushes the foot of a mechanic while he is **repairing** an engine. Accident is not reportable on this form.

Accidents to drivers and helpers not involving the vehicle, itself, are not reportable. Thus, if a driver going upstairs to deliver a package, falls and breaks his wrist, the accident is not reportable. However, had he broken his wrist when stepping off the running board of his truck, the accident would have been reportable.

TABLE II—RECORDS OF DRIVERS IN ACCIDENTS

(If you are using the Council's "Vehicular Accident Record Sheet" for accident recording, totals may be taken directly from it and entered in Tables II and III. If you are using another accident recording plan which provides you with the information requested, please enter it in Table II. Item A-Total and Item B-Total should each equal the total of all accidents.)

A. EXPERIENCE—Total	24	B. HOURS ON DUTY BEFORE ACCIDENT—Total	24
a. Less Than 6 Months		a. Less Than Three Hours	4
b. Six Months to 1 Year	2	b. Three to Six Hours	10
c. One to Two Years	8	c. Six to Nine Hours	10
d. Two to Four Years	9	d. Nine Hours and Over	
e. Four Years and Over	5	e. NUMBER OF DRIVERS—More Than One Accident	4

(Please Enter Data for Table III—Reverse Side)

Figure 3 (Front side). Vehicular accidents should be summarized regularly on this form. The essential data are easily found on the accident record sheet. (Actual size of this form 8½x11 inches.)

TABLE III—CIRCUMSTANCES OF ACCIDENTS

On Table III the total entries under each of A, B, C, H, I, K and L should equal the total number of reported accidents. For Schedules G, H, I and K count totals for ONLY those drivers or vehicles not the other driver or vehicle. In Schedule D there should be an entry for every company driver. Schedules M and N apply to pedestrian accidents only.

A. GENERAL LOCATION	
a. Business District	7
b. Residential District	4
c. Rural District	8
B. TYPE OF ACCIDENT	
a. Pedestrian	3
b. Motor Vehicle	10
c. R. R. Train	1
d. Electric Car	1
e. Bicycle	1
f. Horse-drawn Vehicle	1
g. Fixed Object	3
h. Non-Collision Overturn	4
i. Non-Operating	
C. RESULT OF ACCIDENT*	
a. Fatal	1
b. Other Personal Injury (no death)	8
c. Property Damage Only	15
D. MOVEMENT OF VEHICLE	
a. Turning Right	3
b. Turning Left	2
c. Going Straight Through	13
d. Slowing Down or Stopping	3
e. Backing	2
f. Parked or Standing Still	1
g. Skidding	2
h. Rear-End Collision	1
E. ACTION OF DRIVER	
a. Exceeding Speed Limit	5
b. On Wrong Side of Road	3
c. Didn't Have Right of Way	1
d. Cutting In	1
e. Passing Standing Street Car	1
f. Passing on Curve or Hill	1
g. Passing on Wrong Side	1
h. Failed to Signal	2
i. Improper Turning	1
j. Failed to Observe Stop Sign	1
k. Disregarded Officer or Signal	1
l. Disregarded Slow or Warning Sign	2
m. Drove Off Roadway	1
n. Drove Through Safety Zone	
o. Double or Prohibited Parking	
F. CONDITION OF DRIVER	
a. Intoxicated	1
b. Physical Defect	
c. Asleep	
G. CONDITION OF VEHICLE	
a. Defective Brakes	3
b. Improper Lights	2
c. Defective Steering Gear	
d. Tire Failure or Blowout	1
e. Other Defects	
H. LOCATION ON HIGHWAY	
a. At Intersection	11
b. At R. R. Crossing—Unguarded	1
c. Same—Guarded by Watchman or Gate	
d. Same—Guarded by Automatic Signal	
e. At Bridge or Underpass	1
f. On Curve	2
g. On Hill	2
h. On straight Level Road	6
i. Other	1
I. ROAD SURFACE CONDITION	
a. Dry	14
b. Wet	4
c. Muddy	2
d. Snowy	1
e. Icy	3
J. ROAD DEFECTS	
a. Road Under Repair	1
b. Obstruction Not Lighted	1
c. Other	
K. WEATHER CONDITIONS	
a. Clear	11
b. Cloudy	7
c. Fog	3
d. Rain	2
e. Snow	1
L. LIGHT CONDITIONS	
a. Daylight	14
b. Dusk	5
c. Darkness—No Street Lights	3
d. Darkness—Good Street Lights	1
e. Darkness—Poor Street Lights	1
M. ACTION OF PEDESTRIAN	
a. Crossing at Intersection with Signal	1
b. Same—Against Signal	
c. Same—No Signal	1
d. Same—Diagonally	
e. Crossing Between Intersections	1
f. Playing or Working in Street	
g. Riding or Hitching on Vehicles	
h. Getting On or Off Street Car	
i. Not in Roadway	
j. Other	
N. CONDITION OF PEDESTRIAN	
a. Intoxicated	1
b. Physical Defect	
c. Confused by Traffic	
d. View Obstructed	1

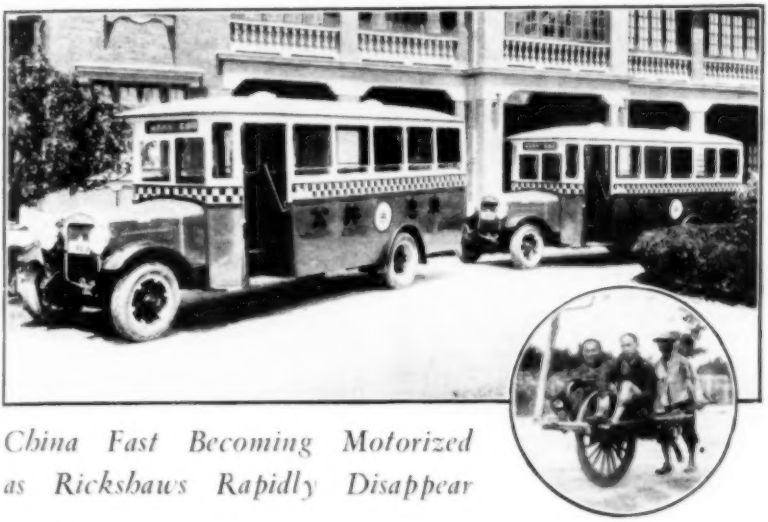
*Accidents involving "Other Personal Injuries" as well as "Fatal" are classified "Fatal"; accidents involving "Other Personal Injuries" as well as property damage are classified "Other Personal Injuries."

Remarks: Intoxicated driver was immediately discharged. At present we are making a drive to keep trucks in good condition, and to prevent speeding.

For Interpretations and Rulings See Safe Practices Pamphlet No. D-4—"Commercial Vehicle Accident Statistics."

Figure 3 (Reverse side). The information on this side of the summary report is taken directly from the accident record sheet. Facts like these make accident prevention simpler.

No More "Wheelbarrows"



China Fast Becoming Motorized as Rickshaws Rapidly Disappear

ALTHOUGH China is many hundreds of years older than the United States, it is only within the past few years that modern methods of transportation have been employed and the ancient means of transportation such as the sedan chair and wheelbarrow have been superseded by the motor bus.

The above illustration is part of a fleet of Stewart buses recently purchased by the Bureau of Public Utilities of the Municipality of Greater Shanghai to connect Pootung (just across the Whangpoo River from Shanghai) with the village of Kaochow.

"The trial runs of these buses were very interesting," states an eye witness—one who has spent many years in all parts of China and who has witnessed the gradual change from man power to these "foreign devil wagons."

"These new buses glided through the congested traffic of native quarters, in and out between the lines of straining, sweating coolies pulling rickshaws, heavily loaded hand carts or struggling with their ancient wheelbarrows—the 'foreign devil wagons' carrying their loads with ease and affording clean comfortable transportation, saving time and speeding up ancient Cathay, where for 2,000 years, time has meant nothing and speed considered not only undignified but absolute proof of insanity.

"It is interesting to note how keen the younger generation is in modern methods and how closely such tests

(*Please turn to page 44*)

as were run with these buses, were watched. The ease with which these buses were handled in dense traffic, the seemingly unlimited power, economic upkeep, were discussed and commented on by the various officials."

New Brake Lining Booklet

A NEW brake lining booklet entitled "Check the Cause of Costly Readjustment" has recently been issued by Multibestos Company, 235 Harvey St., Cambridge B, Mass.

The booklet gives complete information regarding their new "LX" scientifically developed brake lining and also gives the results of some interesting brake lining tests under actual operating conditions. For your copy of this interesting booklet, address the Company mentioned above, or the Editor of this publication.

Heinz Drivers Get Medals

NATIONAL Safety Council medals have been presented to 56 H. J. Heinz Company truck drivers at employee meetings in 28 cities recently. At Pittsburgh, eight drivers received their medals and certificates at a luncheon given in their honor. Associate drivers and company executives were among the guests. At sales branches in other cities, presentations were made at meetings attended by salesmen, office workers and warehouse employees. High executives presided at each and made the presentations.

The awards were made because the drivers did not have accidents in 1930, and N. G. Woodside, a vice president of the company, addressed a letter to each man in which he said:

"It was pleasing to me to learn that the National Safety Council had presented a bronze medal to you in recognition of the fact that you were not responsible for an accident in 1930.

"Fifty-six of our drivers have been honored in this way, and it must be gratifynig to you to know that you are a member of this group.

"The National Safety Council has compiled figures which show that truck accidents have decreased nearly 15 per cent in three years. You have had a part in reducing the number, and by continuing to exercise care a further reduction may be anticipated.

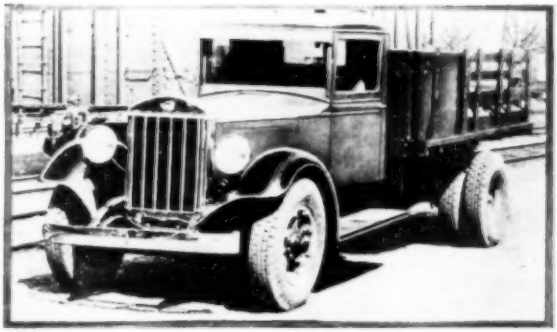
"I congratulate you and hope you may be as successful in avoiding accidents in the future as you were in 1930."

Ignition Cable Bulletins

THE latest bulletins on Beldenlac Aircraft Standard Ignition Cable are now available to our readers without obligation. This new type of cable, it is claimed, will cut your ignition cable bills in half. It is worth-while investigating. The bulletins will be sent without obligation. Write the Editor, or the Belden Mfg. Co., at 4685 W. Van Buren St., Chicago, Ill., and get the facts.

To Handle Brake Service

ARRANGEMENTS have been completed between Russell Mfg. Company and American Cable Company, by which Rusco will handle the exclusive replacements distribution of the Tru-Stop brake. This brake is used by many large bus and truck manufacturers, being standard equipment on over seventy models, according to the Company. Particular attention will be given the service and fleet business.



Reo *offers* 4-Tonner

New Six-Cylinder Truck Is Built for Heavy-Duty Service — Three Wheelbases Available

REO is now producing in its truck plants in Lansing, Mich., and Toronto, Ontario, a new heavy-duty, six-cylinder, four-ton truck. With a gross rated capacity of 20,000 pounds and a net capacity of 13,800 pounds, including body, cab and payload, called for in the specifications, the new truck is a much larger unit than Reo has ever before offered.

The new line of four-ton Speedwagons is offered in three standard wheelbases, 150, 170 and 190 inches. The shortest wheelbase is for dump-body or tractor service. Frame side channels are ten inches deep and one-fourth inch thick, with constant flange width of three inches. Front springs are 40 x 2 inches and rear 50 x 2½, the latter being fitted with helper springs.

Among the features of the six-cylinder truck engine is the chrome-nickel, alloy iron cylinder-block cast integral with the ribbed crankcase, furnishing rigid support for the seven-bearing crankshaft which has journals three inches in diameter turning in interchangeable close-limit type, babbitt-lined bronze bearings. In common with all other Reo truck engines, this design employs full force-feed lubrication to all crankshaft and camshaft main bearings, drilled passages through the crankshaft leading to the crankpins and connecting-rod lower bearings and gun-drilled connecting rods to conduct oil to the hollow piston pins.

With bore and stroke of 4⅛ x 4¾ inches and a displacement of 381 cu. inches, this six-cylinder engine has a taxable horse power of 40.8 and develops 101 H.P. at 2,600 R.P.M. Clutch is of twin dry-plate type, eleven inches in diameter. The low gear of the four-speed, heavy-duty transmission combined with the 6.375 to 1 standard ratio of the spiral-bevel, full-floating rear axle gives an overall low gear reduction of 41.58 to 1.

Cam-and-lever-steering gear with two ball-thrust bearings, roller-thrust bearings between the reversed-Elliott type steering knuckles and the axle I-beam, and correct layout of front axle and steering connections all contribute to steering ease. Fully enclosed hydraulic brakes provide 390 square inches of braking surface, supplemented by disc-type parking brake 14" in diameter, fitted to the propeller shaft. The brakes are fitted with vacuum booster equipment.

Among the body types furnished to satisfy the varying needs of the many industries using trucks of this capacity, Reo supplies high and low side platform bodies with or without ridge poles, van bodies for truck or trailer mounting, all types of dump bodies, oil tank and refrigerator bodies, and various stock rack and farm bodies. Special six-wheel equipment as well as full trailer units are available for use with the tractor.

Low operating and maintenance cost over long periods of service, protection of the commodity transported and comfort of the driver have all been given thoughtful consideration by the designers, according to the Company. The ease of handling and the high degree of comfort that has been built into the cab, those who have driven the new Reo four-ton speedwagon say, insure against strain and fatigue.

Interesting literature covering this new model is now available. Address Reo Motor Car Co., Lansing, Mich., or the Editor, for your free copy.

Lempco $500 Prize Contest

IN seeking a name for their new patented, grooved axle shaft, Lempco Products, Inc., of Bedford, Ohio, is now offering several prizes amounting to $500 for the best suggestions.

The contest is open to everybody in the automotive industry. The first prize will be awarded to the party who submits the best trade name for this axle shaft, along with a brief letter telling "Why I think the grooved shaft is better than the ordinary axle." To quote from the Lempco literature:

"Submit as many names as you wish. The more you submit, the better chance you will have to win a prize. In the event of two or more people suggesting the same winning name, the prize will be awarded the first one received. The names and addresses of the prize winners will be announced in the October issue of MOTOR RECORD.

The new, patented Lempco axle shaft has a spiral groove running around the tapered surface of the axle that fits into the hub. Advantages claimed are that it prevents "frozen" and rusted wheels and permits easy removal of the wheel for brake inspection, etc. Besides retaining grease, the grooves are said to permit circulation of air, equalizing the temperature of the shaft and hub and eliminating the formation of moisture that turns to rust. The grooves also prevent the formation of a vacuum.

We would advise our readers who are desirous of entering in this contest to mail their suggestions now, and not wait until the last minute. Address: Contest Manager, Lempco Products, Bedford, Ohio.

More About Ratings

"I PROPOSE that trucks be rated by the gross vehicle weight that can be hauled up standard grades."—*L. R. Buckendale, Executive Engineer, Timken-Detroit Axle Co., Detroit.*

New "Step-Go" on Dodge

House-to-House Delivery Vehicle on 1½-Ton Dodge Chassis Uses De Kalb "Step-Go" Body

IN response to repeated requests for this particular type of house-to-house delivery vehicle, Dodge Brothers has added to its line of trucks, a ton and a half 4-cylinder unit, equipped with the De Kalb Step-Go body. It can also be had with 6-cylinder engine.

Foremost among the many features found in the Step-Go unit is the single-action control pedal. When this pedal is pressed to the floor the clutch is engaged and the vehicle moves forward at a previously arranged gear speed. Shifting to other gear speeds may be accomplished by a single movement of the control pedal.

Applying the brakes and releasing the clutch is one simple, entirely automatic operation; the operator need only remove his foot from the control pedal. This automatic action is accomplished by means of an ingenious, specially designed set of springs.

An auxiliary brake pedal is in position for use in an emergency, but under ordinary circumstances, this latter pedal need never be used. The driver may step to the ground with assurance that the Step-Go will immediately come to a complete stop.

The body of the Step-Go is of special patented Met-L-Wood with steel on both sides. These panels are reported to be very strong, affording maximum strength and durability besides which they are semi-insulating and free from all vibration. The loading space within the body is 59" wide, 80" long and 56" high. The driver's pit is 72" high.

The rear can be furnished either solid with lookout windows or with double rear doors at no extra charge. The body is equipped with dome-light, rear vision mirror, windshield wiper, nickel-plate hardware tire carrier and rear bumper.

The frame is of oak construction

and all wood parts are dipped in oil to insure against warping. The roof is covered with filled No. 8 white duck and the matched ceiling is fastened on with screws, eliminating all difficulty of nails working through the top material.

As house-to-house delivery trucks are frequently stopped hundreds of times during the day, the four-wheel internal-expanding weatherproof hydraulic brakes with which this Dodge unit is equipped, contribute greatly to its economical operation. Cast Ferro Pearlyte brake drums are used, which are claimed not to get out of round and to insure perfect, even braking at all times.

This truck can be purchased through the Dodge Brothers organization, or from the De Kalb Wagon Company, De Kalb, Ill. Literature, other details and prices sent free on request.

Experienced Maintenance and Delivery Supervisor Available

A PRACTICAL maintenance man, with over fifteen years' experience in operation and maintenance of motor trucks and buses now seeks a connection with transportation or vocational fleet.

In addition to practical fleet maintenance, have had considerable machine shop experience and technical training. Was previously employed by one firm for twelve years as Superintendent of Transportation.

Desire to connect with concern in vicinity of New York City. Complete details as to ability, previous accomplishments and references available on request or interview.—Address communications to Editor, THE FLEET OWNER, 90 West Street, New York City. All replies will be held in strict confidence.

Samuels Back with Lempco

SAM E. SAMUELS has returned to his territory in New York and the New England States as a representative of Lempco Products, Inc., of Bedford, Ohio, according to a recent announcement.

Sam, who has had many years experience as a manufacturer's representative, enjoys a wide acquaintance in the Eastern jobbing trade and many of Lempco's New York and New England jobbers are glad to see him back on the job.

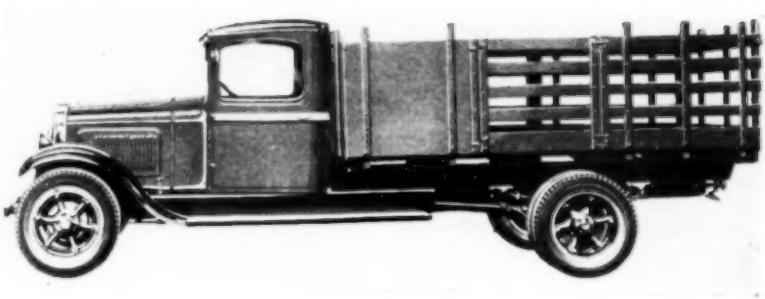
McGraw Joins Multibestos

ONE of the most recent additions to Multibestos Company, of Cambridge, Mass., is Mr. E. H. McGraw, whose appointment as representative for the Eastern Pennsylvania territory was recently announced. The Company is expanding its sales force in order to handle the large amount of steadily increasing business.

Mr. McGraw has for the past ten years been associated with Philadelphia organizations and will have the backing of the Multibestos Brake Service Institute at United Motors Service, 1624 Hunting Park Ave., Philadelphia, Pa.

New Brake Service Bulletin

A NEW bulletin describing Wagner's Brake Service has just been published. It invites all owners and operators of trucks, trailers, busses, etc., to avail themselves of the Company's service through its 25 factory brake service branches and 900 franchised independent brake service companies. Copies of this bulletin will be sent free on request. Address: Wagner Electric Corporation, St. Louis, Mo.



New Willys Truck

Six-Cylinder Job, Offered on 157-Inch Chassis, Recently Added to Willys' Commercial Line

COMPLETING its commercial program this summer, the Willys-Overland Corp. recently introduced a new model Willys Six truck designated as Model C-157, on a 157-inch wheelbase chassis, a 1½ ton unit.

Body types are offered to meet every industrial and agricultural need, and the new model claims such features as 65 h.p. engine, four-speed transmission, full-floating rear axle, cable-controlled Bendix brakes and heavy frame with bridge-type cross members.

The six cylinder engine employs forced-feed lubrication in conjunction with the Float-O oil device. Three-point engine suspension is employed and the crankshaft is supported by four bearings.

Transmission is of the sliding-gear type in unit with the engine with opening for installation of power take-off. The total gear reduction is 40.8 to 1. The 10-inch clutch is of the dry disc type with ball bearing throw-out. Rear axle is of spiral-bevel type with straddle-mounted pinion.

Brakes are of the Duo-Servo type, 12 inches diameter in front and 16 inches diameter at rear. Wheels are of heavy-duty cast steel with demountable truck type rims. Rear wheels are available either single or dual, the latter of the one-unit design. Springs are of the semi-elliptic type.

Bodies for all needs are provided. Among them are included a De Luxe Cab and Pickup; De Luxe Sedan; Panel Delivery; De Luxe Canopy Top Express; Ambulance, Patrol or Funeral Service Unit; Cab and De Luxe Van Type Panel; Cab with Stake Body; Cab with Milk Can Body; Cab with Wide Express Body; Cab with Combination Grain and Stock Body; Cab and Chicago Stake Body; Cab and St. Louis House Top Rack Body; Cab and Wood Garbage Body with Hand Hoist; Cab and Wood Dump Body with Hydraulic Hoist; Cab and Ditwiler Dump Body with Ro-

tary Power Hoist Comb; Cab with Anthony Pipeless Hydraulic Dump Body; School Bus, Wayne Body Model; DeLuxe Sedan Panel; Superior All-Steel School Bus; Cab and Canopy Top Express; Cab and De Luxe Van Type Panel; 42-inch stakes.

Multibestos Adds Two

THE sales of Multibestos brake lining and clutch facings are increasing daily and with this increase comes the necessity for Multibestos Company to expand their forces. Therefore, the Chicago staff of Multibestos Company has been augmented by two men—Clarence F. Boothe and C. L. Swander. Both of these men have already established themselves as leaders in their respective fields.

Mr. Boothe is connected with the Chicago Multibestos Brake Service Institute, one of the chain of nation-wide Institutes which Multibestos has established with such outstanding success.

Mr. Swander has been appointed sales representative with headquarters at the Multibestos Chicago office. His previous connections and popularity among members of the automotive industry qualify him eminently for this position.

Position Wanted

TRANSPORTATION Supervisor of Maintenance, available now. A man with an exceptional background, who has proven his ability both as a mechanic and as an executive. Willing to locate anywhere. Free to travel.

Any firm desiring to connect with this man can do so by writing to the Editor, *The Fleet Owner*, 90 West St., New York City. Your letter will be duly forwarded, in strictest confidence.

Gets Two Large Truck Orders

ADDING to their already large fleet of trucks, the Reick-McJunkin Company, Pittsburgh, subsidiary of the National Dairies, recently placed an order for 28 more units. The order was placed through Frank D. Saupp, Inc., Dodge Brothers' dealer for the Pittsburgh area.

Regarded as one of the most alert and energetic dealerships in the entire Dodge Brothers' distributing organization, Frank D. Saupp, Incorporated basked in the spotlight of publicity recently, when they secured an order for 30 Dodge trucks from the Ward Baking Company. Incidentally, that order was the largest truck order placed by a commercial firm in the Pittsburgh area so far this year. The Reick-McJunkin order ranks second, according to Dodge officials.

New Reo Sales Manager

MILTON A. HOLMES, for many years one of the outstanding figures in the motor truck industry, has been appointed Sales Manager of the Truck Division of the Reo Motor Car Company, it is announced by Elijah G. Poxson, General Sales Manager of the Company. Just prior to his appointment Mr. Holmes was Reo's regional representative on the West Coast.

Two Link-Belt Warehouses

TWO new warehouses have recently been opened by the Link-Belt Company, in cooperation with the Republic Gear Company and Thompson Products Company. One is located in New York City, at 245 W. 67th Street; the other in Kansas City, at 1739 McGee St. Complete stocks of Link-Belt timing chains will be carried, according to Harry Reisser, manager of the replacement division.

G. M. T. *City Service* Coach

New Type "V" Has Power Plant That Can Be Removed by Two Men in Ten Minutes, It Is Claimed

A NEW 29-passenger city service coach has been developed within recent months by General Motors Truck Co. of Pontiac, Mich., designated as type V-29.

One of the most interesting features of this job is the fact that the entire power plant can be removed by two men in less than ten minutes, according to the manufacturers, without disturbing various adjustments, or even removing the water from the radiator. Electrical, water, gasoline and exhaust connections are fitted with quickly detachable joints. A few simple tools, an overhead crane, and an engine stand plus two reasonably capable men are all the requirements for this operation.

The coach is powered with the "468" engine which number is derived by using its cubic inch displacement. Bore and stroke are 4½ x 5½ inches, and power developed exceeds 115 h. p. at 2200 r.p.m. Maximum torque is 340 ft. lbs., developed between 1000 and 1400 r.p.m. Valve mechanism is of the overhead type with "zero lash eliminator."

Accessories include oil cleaner, oil cooler, air cleaner, downdraft carburetor and fuel pump. Starting, lighting and ignition system are of the 12-volt type with specialty designed units.

A twin-disc type of clutch is used, with fabric friction lining. Transmission has four speeds forward and one reverse, mounted as a unit with the engine. Two propeller shafts of the tubular type are used, equipped with Spicer universal joints and self-aligning center bearing. Steering gear is of the cam-and-lever type.

The frame is emphasized by the manufacturer as being especially rigid, having four tubular crossmembers, and three of the pressed-steel type. Springs are of the semi-

elliptic design, the front ones being shackled at the front end. The first and second leaves go completely around the eye and the third leaf carries well up over the edge, which is said to provide unusually great service.

Front axle is of the reverse-Elliott, I-beam type with low spring centers. Rear axle is a Timken-built, bevel gear, full-floating type.

Four-wheel, internal-expanding Westinghouse air brakes are used, with chambers mounted integral with the axles. Drums are 17¼ x 4 inches, front and rear. Shoes are of the four-piece type, equipped with detachable brake blocks, giving a total area of 676 square inches of lining. Emergency brake is of the internal-expanding type, mounted at the center drive-shaft bearing.

Wheels are of the pressed-steel, disc ventilated type, single front and dual rear. Standard tires are 9.00-22, 10-ply balloons. Details of body construction, capacity and seating arrangement will be cheerfully furnished by the manufacturers on request.

Saves Six Dollars a Day

ONE of the largest truck units of its kind in the world is operated by the Seaconnet Coal Company, of Providence, R. I. An outstanding feature of this unit, a six-wheel truck chassis, is the manner in which its huge size of twelve tons carrying capacity is combined with lightness in weight. Handling sixteen cubic yards of material, this body, built of aluminum, weighs less than half as much as if it were constructed of steel.

Two notable advantages are thereby created. The use of aluminum enables the truck, body and load to qualify under the Rhode Island law which places a maximum limit of 40,000 pounds gross weight. At the same time, cost records kept by the company show important operating savings, amounting to approximately $6 a day, due to the aluminum construction. As a consequence, it is figured that the cost of the aluminum body will pay for itself in a few months of operation.

Smooth-On Handbook

THIS is a 136-page, carefully indexed and illustrated instruction and reference book explaining Smooth-On and its uses under a wide range of manufacturing, maintenance and repair needs.

The pages of this book explain the properties of Smooth-On products, describe each kind of Smooth-On in detail, tell where and how each should be used, what saving in labor, time and expense is assured by the Smooth-On method, and illustrate what can be and what has been accomplished under many common conditions. 193 Diagrams and pictures assist in making the practical hints most useful.

Every fleet maintenance man can make good use of this booklet as a valuable guide in making emergency and routine repairs. For your free copy address Smooth-On Mfg. Co., Dept. 71, 574 Communipaw Ave., Jersey City, N. J. The Editor will get a copy if you prefer. Ask for the Smooth-On Handbook.

Truck Operating Business

"IT seems that much of the motor truck service can best be performed under contractual arrangements or by a forwarding and distributing company that is engaged principally in the business of operating motor trucks."—*A. H. Gossard, Middle West Utilities Company.*

The Trouble Shooter

A DEPARTMENT devoted to correspondence from readers of THE FLEET OWNER. Any questions having to do with fleet maintenance will be answered. All properly signed inquiries will be replied to by mail and such of them as are believed to be of interest to other readers will be published in these columns.

Address your questions to the Trouble Shooter Editor. We must decline to reply to correspondence not signed with the writer's full name and address.

Your Plugs Are Wrong?

Question: We have just ground the valves on a 1928 G. M. C. truck that is equipped with a Pontiac engine and although the compression is good, valve tappet clearance is correct and ignition points have been replaced, it does not seem to run well at low speeds without missing.

Thinking the condenser might be bad, we replaced that as well, but the results are no better. We are using 7/8-inch plugs of the regular type and have cleaned them thoroughly. What can you suggest that may be wrong? Carburetor and timing we are sure are correct.—D. N., Boston, Mass.

Answer: You seem to have done a most thorough job and since you believe everything else is correct, there is but one loophole in your story, and that is the spark plugs. You state you are using 7/8-inch *regular* plugs. According to our records, this job calls for 7/8-inch *long* plugs.

If you are using the regular plugs, which are too short, we have no doubt that some of the dead exhaust gases are pocketing in the firing chamber and preventing the incoming charge from firing. This will be particularly noticeable on a pull at slow speeds. We would suggest that you change to the proper type of plug, and are sending you under separate cover a spark plug chart that shows the right size for all motors for your future convenience.

(Editor's Note: We sent this reader a spark plug chart that shows the correct size and type for all makes of motors in trucks, busses, passenger cars, tractors, etc. It also includes information on hot and cold plugs. This chart is available to all fleet owners, free of charge. It can be obtained by writing directly to the Editor and asking for the Spark Plug Chart.)

Factors Affect Vapor-Lock

"FOUR factors affecting vapor lock are: vapor pressure of the gasoline, design of fuel-feed system, atmospheric temperature and altitude."—*D. B. Brooks, Bureau of Standards, Washington, D. C.*

Assembling Ford Hubs and Drums

THE assembling of old hubs to new Ford drums should offer little or no trouble if the proper tests are made before and after each assembly.

Before riveting the old hubs to the new drums, we suggest that you make a temporary assembly of the hub and drum with the aid of the original nuts and three-quarter round washers. With the complete unit assembled it is then possible to locate the defects before riveting.

If the unit runs out at either the braking surface or the hub, it will not give proper braking after it has been installed. However, if the drum shows a slight wobble at the outer edge and runs true at the hub and braking surface it may be installed and best of results obtained.

In cases where the hub or braking surface appears to wobble, run-out or shows any effects of out-of-roundness, it is best to check each possible defect carefully before assuming that either the hub or drum is faulty.

Check over each rivet and make sure that all the nuts have been drawn down tight with a wrench. After this is checked, dismantle the unit carefully and note whether dirt, sand or any foreign particles have been lodged between the inside bottom of the drum and the hub flange. (The smallest piece of metal chip is apt to prevent a flush contact between the hub flange and the drum.)

Replace the hub on your testing lathe and note whether core runs-out and whether hub flange runs true. Very often a hub flange is thrown out-of-round by a too severe road shock or side-skid into a curbstone. If flange appears to have a slight wobble it will naturally be the cause for throwing the entire unit out. (A thin cut taken from the hub flange should eliminate this trouble and return the running of the hub flange back to normal.)

However, you will find that the drum itself will be the cause for out-of-roundness more often than the hub flange or core. The drum may easily be trued up by taking a light cut from the braking surface. A very thin cut will in no way weaken the drum.—*Suggested by Lempco Products, Inc.*

They All Say "O. K."

Question: Are any Chrysler motors so machined that it is impossible to rebore the block accurately from the top? We understand from a Chrysler dealer that the block should not be rebored but should be honed. What is the correct dope on this?—E. A. S., Lawrence, Kans.

Answer: We have just been in touch with several leading jobbers and reborers of this city who are using such machines as the Rottler, Hall, Storm, St. Louis, etc., and they tell us that they are reboring Chrysler blocks every day in the week and that they have never had any comebacks on these particular cars. If the "proof of the pudding is in the eating" we would be inclined to believe that Chrysler blocks can be rebored successfully from the top of the block.

Of course, some people claim that the only way to rebore a job is by using the *lower* plane of the cylinder block as a guide, which often necessitates removing the block from the chassis. Then, there are others who are reboring from the top with every degree of success, who claim that this is the only prac-

tical, *economical* way of doing this kind of a job.

We are not aware that Chryslers are constructed differently than other motors, with reference to the cylinder head plane. Offhand, we would say that there is no material difference and that you can rebore Chryslers in any manner you choose. Experience is *still* the best teacher.

Where Is the Rattle?

Question: I am writing for information on a DA Dodge, 1929. This car has had new pistons, rings and pins and the rods were properly aligned. It still has a rattle that sounds like it is "valves," but the valves are properly adjusted at the tappets. The car has gone over 18,000 miles. What is necessary to make it absolutely quiet?—E. R. R., Stanford, Ky.

Answer: We note that this job has had new pistons, rings and pins and the rods aligned, so will presume that these members are not causing the noise. It is probably in the valves, or a loose timing chain that hits the side of the case and causes the noise you describe.

It goes without saying, of course, that a motor that has been run for a couple of years cannot be made absolutely quiet unless *all* of the worn parts are replaced. We refer in this case to valve tappets, valve guides and other moving parts in the valve assembly.

It is quite possible that the valve stems are a sloppy fit in the valve guides. This condition sometimes causes annoying rattles that are hard to locate. Worn valve tappet guides likewise are likely to be noisy. Then, too, if the valve tappet screws are worn with hollow spots, it will be practically impossible to make proper adjustment. If you want to make this motor absolutely quiet, your only salvation is to replace the entire valve, guide and tappet assemblies.

Thanks, Mr. Rennells

To the Editor: The little "Fleet Owner" that you send us each month is of great interest. At present we are doing all the repair work on our fleet of dairy trucks which consists of twenty-nine trucks and four passenger cars. The only work we send out is spring repairs and armature turning and rewinding. I wish to make a suggestion that may help some other fleet operators:

On many motors the oil filler pipe and breather are made of thin steel tubing with baffle plates welded in them. These plates collect a great deal of sludge so that when refilling the crankcase, the oil runs in very slowly.

A very cheap repair is to heat the tube with a torch that will melt or burn the plates clean. Of course, the motor should be clear of gas and oil to prevent fire while burning the excess sludge.—*Oscar M. Rennells, Springdale, Conn.*

Oil Reclaiming Literature

CONSIDERABLE interest has been manifested by fleet owners in the past few weeks on the subject of reclaiming crankcase drainings. In fact, our Editorial offices have been swamped with requests from readers for more information on the subject.

Should any of our readers still desire literature and catalogs describing the various makes of oil reclaiming machines now on the market, we shall be very glad indeed to see that you are promptly supplied. Drop a line to me, and ask for Oil Reclaiming Literature. No obligations, of course.—*The Editor.*

Save the Cork for the Bottle

Question: We have a Nash Standard Six, 1929 model which is giving us carburetor trouble. The engine will stall whenever it is idled and it does not accellerate well. This job has a Marvel carburetor and Kingston vacuum tank.

We note in the vacuum tank connection at the top, that there is a three-way fitting, one opening leading to the manifold, one to the windshield wiper and the other one being open. When the engine runs it sucks in air. The only way we have been able to get the engine to run fairly well without stalling was to put a small cork into this opening, but after running for about ten minutes the engine loaded up with gas and stopped.

Please advise whether or not this hole should be left open and just what our trouble is.—J. K., New York City.

Answer: Save the cork for the bottle, brother. This hole is supposed to be left open for the purpose of drawing in additional air for the carburetor. The sucking noise is o. k.

It seems to us that your Marvel carburetor is adjusted too lean and that it is not getting a good mixture to the cylinders. In adjusting the large screw, this screw should be set even with the end of the locking lever, for best results.

If you can't make the engine run well by adjusting it, it is possible that the jets in the carburetor are plugged up with dirt or foreign matter; or else there is water in your gasoline.

There is nothing complicated about the Marvel carburetor and you should have no trouble with this end of it. With regard to the vacuum tank fitting, it is obvious that when you cork up the open end, your engine draws in less air and a proportionately greater amount of gasoline, seeming to run well at first and finally loading up and stalling. That's why we are inclined to believe that your trouble lies in the carburetor being adjusted too lean, or a stoppage of fuel somewhere in the line.

Some Uses of Alcohol

THERE are many uses of alcohol (distilled denatured) in minor service operations around the cars, garage and shop, without the use of special tools or equipment.

For instance, alcohol makes a very effective remover of carbon from engine cylinders, at a cost of about three cents per cylinder. Sticking valves can be freed by an injection of alcohol into the carburetor air intake. When water in the gas tank causes stoppage in fuel supply, alcohol will remove every trace of moisture.

Among other uses are the cleaning of white side-wall tires, tops, windshield, etc.—*Suggested by U. S. Industrial Alcohol Company, New York City.*

When to Renew Brake Drums

THERE are two things to do to an out-of-round drum—true it or replace it with a new one. Ordinarily the remedy is by turning in a lathe or grinder, but frequently a drum will be found too thin to make this advisable. In such cases, replacement is necessary.

What the minimum thickness of a drum should be depends on several factors—and also on good judgment. Drums on an external brake, for example, can usually be turned down more than those on an internal brake, the pressure exerted on the latter type under brake application being

considerably greater. If the brake has a high self-energizing effect, the drum will stand less turning than if the self-energizing effect is low. The speed at which the car is normally operated is also a factor to be considered—the higher the speed and the more severe the brake application, the greater should be the minimum thickness.

Because of such variable factors, no fixed rule governing drum thickness can be given which will apply in every case. However, the following table will be found helpful. It gives minimum thicknesses for the various diameters, as indicated by average practice.

11 inch drum 0.120" thick
12 inch drum 0.135" thick
13 inch drum 0.150" thick
14 inch drum 0.165" thick
15 inch drum 0.180" thick
16 inch drum 0.195" thick

If the thickness will be reduced by turning below that given in the table, the drum should be replaced.—*Suggested by Johns-Manville Corp., New York City.*

Trouble with Packard Fuelizer

Question: I have in my care a Packard Roadster which is equipped with a "fuelizer." It is a straight-eight job. I cannot get the fuelizer to burn—only a very faint spark. A new coil has been installed; manifold has been cleaned; also a new fuelizer plug installed, but no better results. I notice there is a sort of click or snapping noise coming from the fuelizer side of the coil. All new wiring has been installed and I am at a loss as to what to do next.—F. A., Ponca City, Okla.

Answer: In spite of the fact that you claim to have put in a new coil, we are inclined to believe that your coil is punctured which results in the weak spark you are getting. The click or snapping noise which you mention coming from the coil, would indicate that the spark is jumping inside, through faulty insulation.

To test this coil on a test bench, use two spark plugs and connect the shells of both plugs together, at the same time running a good ground wire back to the battery from the shells. If the coil is good, sparks will jump from both plugs; if not, only one plug will fire, or none at all. The faint spark you mention might be caused by a poor ground at the fuelizer plug, although this is hardly possible.

It is quite possible that this new coil has been damaged by running the engine with the wire disconnected from the fuelizer plug. This would cause the insulating material in the coil to be punctured, making a connection through which the fuelizer spark could jump.

We would suggest that you test this coil in the manner described above and if possible try a new coil which can be obtained from your jobber or from the Packard agency in your territory. Don't run the engine with the fuelizer wire disconnected from the fuelizer plug.

Signs of Prosperity

SALES of Perfect Circle rings in June proved to be the largest in the company's history, registering a gain of 43 per cent over June, 1930. Replacement sales during the same month, through jobbers, showed an increase of 76 per cent over June, 1930. Replacement sales for the six months period also showed a gain of 57 per cent over the first six months of 1930, according to a recent bulletin.

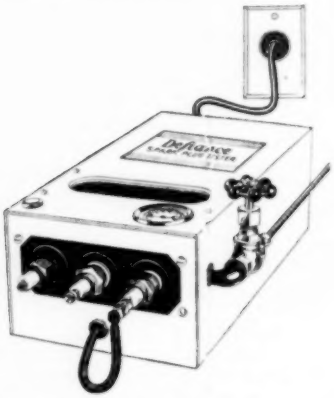
What You

New Products of Interest

Spark Plug Tester

THIS tester indicates, through the application of high tension electric current and air pressure, whether a spark plug has reached a state of deterioration sufficient to prevent it from firing under pressures approximating those in engine cylinders.

For instance, failure of plugs to spark at an average pressure of 70 pounds per square inch reading on the tester gauge, usually indicates the desirability of replacement because of deterioration.



The reason for failure of a spark plug to fire under this average compression may be excessive spark gap, but more frequently it is due to deterioration or severe fouling. Under these circumstances it has been found that readjustment and cleaning result in only temporary relief from trouble, and that time, further difficulties and money are saved in the end by replacement at once with new plugs.

The Defiance Spark Plug Tester is finished in orange Duco and comes complete, ready to install. The tester is furnished, unless otherwise specified, for use on a 110 volt, 60 cycle alternating current circuit. Testers can also be furnished, for use on other voltages, or battery circuits, and can be arranged for operation on both battery and lighting circuits.

Offered to fleet owners by Defiance Spark Plugs, Inc., Toledo, Ohio, who will gladly send literature and prices on request. This firm is also distributing free of charge to fleet owners a carefully prepared spark plug chart that shows the correct type of plug to use in all truck, bus, passenger car and industrial motors. Free copy sent on request.

New Smooth-On Booklet

"HELPFUL Ideas for Engineers" is the title of a brief, but interesting booklet recently issued. It contains a collection of important shop-kinks that have been abstracted from the regular 136-page Smooth-On Handbook.

Either or both of these handy little books are offered to readers of this publication free of charge. Address Smooth-On Mfg. Co., Dept. 71, 574 Communipaw Ave., Jersey City, N. J., or the Editor of this publication for your free copy.

WANT to KNOW

Thermoid Brake Blocks

ENGINEERS of the Thermoid Rubber Company have just announced an improved brake block that is said to greatly affect the cost of brake up-keep on high speed trucks and buses.

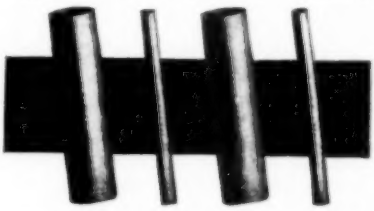
The Thermoid engineers contend that heat is the most destructive factor affecting the life of brake lining. They take the stand that previous methods of overcoming heat by lowering the co-efficient of friction tended to decrease the efficiency of the brakes. However, with the new Thermoid process, specially developed compounds absorb the tremendous heat, yet retain the high co-efficient of friction necessary for light pedal pressure to give quick, smooth stops, according to the makers.

The new Thermoid blocks are of the "full-coverage" type, giving more braking surface than the "keeper" type, and are wire reinforced throughout the entire thickness, which tends toward even wear until worn wafer-thin. Write to Thermoid Rubber Company, Trenton, N. J., for complete details and prices.

Bunting Bronze Bars

THE Bunting line of cored and solid bronze bars for auto service purposes has been increased to include 115 stock sizes which are carried by all auto wholesalers distributing Bunting service and replacement parts and products.

Bunting bars claim a superior machineability due to exact metallurgical analysis, perfect metallic structure and accurate casting.



These bars of bearing metal are largely employed by the auto service industry for special bushings, bearings and bronze parts which must be machined in the service shop.

For complete catalog on all bronze products, write directly to Bunting Brass & Bronze Co., Toledo, Ohio.

Eveready "Rustone" Introduced

CHEMISTS and automotive engineers have been working on the problem of rust in cooling systems for many years and as a result, the National Carbon Company, Inc., makers of Eveready Prestone, now announce a produc; which will prevent the rusting of automobile systems—Eveready Rustone.

Most automotive service men realize that rust forms in cooling systems, but many of them are just beginning to appreciate the trouble it can cause. Corrosion and rusting begin when water is first put into the cooling system and from then on makes a continuous attack on all exposed iron and steel parts. If neglected, this results in overheating and possibly serious damage.

Heat increases corrosion and the formation of rust. Therefore, during warm weather driving, rust accumulates more rapidly, thus interfering with proper cooling of the engine at the time when it is needed most.

Eveready Rustone is a special compound which, when added to the automobile cooling system stops the formation of rust and protects the system from the corrosive action of water.

Eveready Rustone is simple and easy to service. It is only necessary to drain and flush the automobile cooling system, then fill it with clean water. With the engine running, pour the contents of a can of Eveready Rustone into the radiator. Eveready Rustone does not evaporate, and one supply, used as directed, will last during the entire warm weather driving season.

The new product is on the market in one pint cans, one pint being sufficient to service any cooling system up to six gallons. The price per can is $1.00.

A new edition of the Company's "Cooling System Manual" is now off the press. Copies are free for the asking. Write to the National Carbon Company, 30 E. 42nd Street, New York, or to the Editor, for your free copy.

Three New Lempco Warehouses

FOLLOWING its policy of improving delivery service to customers, Lempco Products, Inc., Bedford, Ohio, manufacturers of automotive axles, worms, gears and brake drums, announces the opening of three new warehouses.

In Chatham, Ontario, Canada, Colonial Traders, Ltd., are warehousing Lempco products at 277 William Street. The Chicago warehouse is located at the Automotive Warehouse Company, 2335 S. Michigan Avenue. The Replacement Parts Warehouse Company, of 443 E. Fort St., Detroit, Mich., are handling the Lempco line in that city.

Other Lempco warehouses are located in Minneapolis, Atlanta, Los Angeles, Kansas City, San Francisco, Dallas and New York City.

D.D. Brake-Drum Bands

DESIGNED primarily for Model A Fords, the Double Diamond brake drum reinforcing band, recently announced by Automotive Gear Works, Richmond, Ind., will also fit a great many other cars, including De Soto, Dodge, Durant, Erskine, Essex, Marmon, Plymouth, Roosevelt, Whippet and also those cars and trucks having brake drums of 11¼ inches outside diameter.

Advantages claimed for these bands are that they will permanently eliminate brake drum distortion, noise and chatter caused by drum vibration; give a softer, smoother and solid brake; assist in cooling the drum, and lengthen the life of the brake lining. It is said that brakes require less frequent adjustment when these bands are installed.

These bands, except for size, are the same type which for more than two years Double Diamond has been supplying as original equipment on high-priced cars and also for some applications of a leading axle manufacturer.

Because of the channeled design, these bands provide better radiation of heat generated in the drums. They provide complete reinforcement of the brake drum and without adding any material weight. Write to Automotive Gear Works, Richmond, Ind., for further details; also for free copy of book entitled "Modern Methods of Rear Axle Gear Installation." Both will be sent without cost or obligation.

Hi-Comp. Head for Fords

A NEW replacement cylinder head for the Model A Ford is announced by John C. Hoof Company, 162 N. Franklin St., Chicago, Ill. It is a high-compression job with a 6 to 1 ratio and is illustrated herewith.

The head chamber is so designed that when combustion takes place, there is no detonation and it is also claimed that carbon deposits are practically eliminated, due to the turbulence of the incoming gases in the combustion chamber.

Each head is shipped complete with special metric spark plugs to resist the heat of high compression and special high compression gasket.

The maker claims that this head will give an added top speed of 10 to 15 miles per hour, increased horsepower at any given r. p. m., better acceleration and smoother operation without pre-ignition or detonation. Sold through jobbers. Write direct for complete literature, details, prices and other information.

Oil-Resistant Cable

AN ignition cable specially developed to resist oil and wear due to excessive vibration has been announced by the Belden Manufacturing Company, 4685 West Van Buren Street, Chicago, Illinois.

Tinned copper wire (19x27) is imbedded in a specially developed orange rubber insulating core. A cotton braid is applied which is impregnated with Beldenlac Aircraft standard lacquer. At this point the cable is the same as the regular Beldenlac Aircraft Standard Ignition Cable. Over this is wound varnished cambric tape. A cotton braid over the tape is coated with Beldenlac Aircraft standard lacquer. Thus the new cable has three strong protective layers besides the usual insulating core, braid and lacquer.

No. 7781 is recommenced for "oil splashers" trucks, and buses that see continuous service, and airplanes.

A free sample of this new cable is offered to fleet maintenance men. Write directly to Belden Mfg. Co., 4685 W. Van Buren St., Chicago, Ill.

New "Piston Ring Facts"

THE 1931 edition of "Piston Ring Facts" has recently been released by the Simplex Piston Ring Company of America, Inc. It is a 150-page volume containing complete and detailed instructions for installing new rings on every make and model made during the past several years.

A feature of the book is the detailed drawing of each piston, exactly as it appeared as original equipment in the motor. For further details regarding this book, address Simplex Piston Ring Company, 1966 E. 66th St., Cleveland, Ohio.

Panyard Compression Ring

THE Panyard compression ring, a product of Panyard Piston Ring Co., Muskegon, Mich., is illustrated here.

This patented piston ring is claimed to conform to the shape of worn cylinders and to cause no undue wear or friction. It is built in two pieces (exclusive of the expander) which contact with each other diagonally. Thus the angle of applied force causes the triangular upper part of the ring to wedge closely to the cylinder wall and top of the piston groove, while the lower section butts firmly against the bottom of the groove, both making for a complete seal of the ring groove.

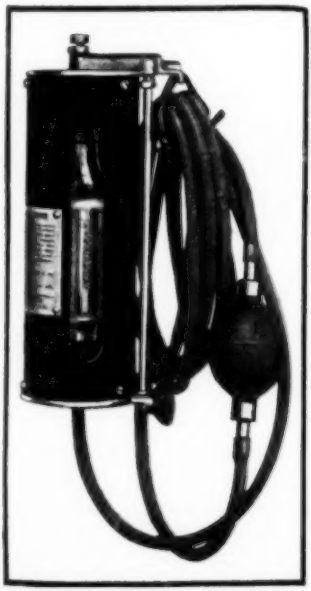
The Panyard ring is made of soft grey cast iron, is flexible and bends out of round very easily, according to the makers. With the expansion spring behind it, it is said to readily conform to the shape of the cylinder wall, even if distorted. This ring is also made in oil-control type. Literature, prices and other details will be sent on request.

Penberthy Mileage Tester

AN improved tester for determining the "miles per gallon of gasoline" is announced by Penberthy Injector Company, 1242 Holden Ave., Detroit, Mich., and illustrated here.

Essentially, the tester consists of an accurately graduated glass bulb, a venting arrangement and two lengths of rubber tubing. One tube is used to convey the gasoline from the fuel line to the measuring bulb, the other to carry the gasoline from the bulb to the carburetor. To install the tester it is necessary to break but one fuel line connection.

The tester operates on the principle of the syphon; for priming, a rubber bulb is provided in the tube that connects the fuel line and tester. No pump is needed and there are no electrical connections to be made.



When in use the tester is suspended on the glass in the right-hand door. Instructions for use are printed on the nameplate of tester. Write for complete literature, details and prices to Company mentioned above.

New Timken Differential

A HIGH traction differential for both motor trucks and passenger cars, which is said to have decided advantages over the type now in general use, has been perfected and patented by The Timken-Detroit Axle Company, it is announced by Col. Fred Glover, president. Cars which won first and second places in the recent Indianapolis Motor Speedway race were equipped with this new gear.

An outstanding feature of this new differential is that wheel spinning, so common in mud or sand, or upon icy pavements, is very materially reduced, as additional power is transmitted to the wheel that has traction. In contrast, a differential of conventional design can deliver no more power to the wheel having traction than to the spinning wheel, which is insufficient to propel the vehicle. For further particulars address Timken-Detroit Axle Company, 100 Clark Ave., Detroit, Mich.

S. A. E. Transportation Meet

THE Annual Transport Meeting of the Society of Automotive Engineers is to be held in Washington, D. C., October 27th to 29th inclusive, instead of in November as originally announced.

You *will surely want a copy of*

"ELECTRICAL TROUBLE SHOOTING"

(on the Motor Car and Airplane)

By A. H. PACKER

A new edition is just off the press. It covers everything from wiring to armature rewinding. Takes up generators, starters, cutouts and regulators on all cars, trucks, busses and airplanes. Contains scores of test kinks that will be found handy in the shop. Explains test bench construction; takes up flat rates; in fact anything electrical in the automotive game.

Earns its cost on first job's profits. Has 47 chapters, 530 pages, 353 illustrations, over 600 questions and answers, four trouble shooting charts and a thorough index. Size 5½ x 8 inches. Flexible binding. Price $4.00. Sold on five-day trial. Money back if not satisfied.

Book Department

The FERGUSON PUBLISHING CO.,
90 West Street New York City

Servicing B & B Clutches

(*Continued from page 31*)

compared with a new driven plate assembly.

B. Mounting Rings: The three levers are mounted on a malleable mounting ring which is bolted to the clutch cover. This should be checked for flatness and straightened so that it will lie flat against the clutch cover. If the levers and pins are excessively worn a complete mounting ring assembly should be installed. Never attempt to use one new part with used ones.

C. Springs: A slipping clutch or failure to adjust it may produce enough heat to reduce the tension of the springs. Inasmuch as the spring pressure varies in different cars it is best when in doubt to install a new spring.

To reassemble the clutch, reverse the procedure given for disassembly, as previously outlined in this article:

1. Loosen adjustment bolts (A in Fig. 4) and move them to the left ends of the slots. If another set of holes now appear in the right end of the slots, remove these bolts and place them in the other set of holes and again move them to the left ends of slots. Do not tighten the adjustment bolts fully until after the clutch has been assembled to the motor and adjusted.

2. Pack a teaspoonful of vaseline in the clutch pilot bearing.

3. Place driven plate assembly in flywheel with the chamfered end of hub to the rear.

4. Insert the three dowel pins, squaring up the flat sides so that they will be parallel with the sides of the slots in pressure plate.

5. Place pressure plate in flywheel being sure it is a free sliding fit on the pins. Do not file slots if ring sticks. See that pins are turned so that flat sides are parallel with slots.

6. Place cover assembly in flywheel, lining up the holding bolt holes. Before inserting screws check the location of the levers and be sure that they bear near the low points of the three cams on pressure plate.

If levers do not bear at low points of cams it may be due to the mounting ring being applied in the wrong position. If such is the case the two adjustment bolts should be removed. Turn the mounting ring one-half way around and reassemble the adjustment bolts (A in Fig. 4).

7. When the cover assembly is lined up with the flywheel, use an extra shaft or aligning arbor, or if none is available remove the clutch shaft from the transmission. Insert arbor or clutch shaft through sleeve, driven plate hub and into pilot bearing. With the parts thus aligned insert and tighten the clutch holding screws, then remove blocks and pull out aligning shaft or arbor.

8. The transmission can then be assembled to the motor. After this has been completed, the clutch and clutch pedal adjustment should be adjusted as outlined in section "B" of this article.

Do not, under any circumstances, let transmission hang in clutch assembly. Do not put oil or kerosene in the clutch and keep the facings dry.

Cooling Exhaust Valves

"EXHAUST valves of both aircraft and automobile engines are today subject to far more severe conditions than they were a few years ago. They should be cooled by salt, sodium, or other means."—*A. T. Colwell, Chief Engineer, Thompson Products, Inc., Cleveland.*

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Copper-Cooled Valve

A COPPER - COOLED valve, making it possible to equip automobile and truck engines with the self-cooling type valve used in aircraft motors, is now offered by Thompson Products, Inc., Cleveland, Ohio.

The Thompson copper - cooled valve is regarded as a radical improvement. To the heat-resisting qualities of highly specialized valve steels, a new element—heat conductivity—is added. The result is a cooler running valve and new standards of valve efficiency and service life.

In the new valve, copper is forged symmetrically into the valve stem and head. As a result the valve runs cooler, engine efficiency is raised, the valve lasts longer and the period between regrinds is lengthened.

Coolant valves, such as used in aircraft engines, would have been adopted by manufacturers long ago as a means of increasing motor performance but for high cost. Copper-cooled valves, which are said to be comparable in merit to the salt-sodium type, can be sold in the solid steel valve price range, however.

Copper-cooling of valves is based on the principle of conduction. During manufacture, the copper core is bonded to the valve steel. In operation the copper, which is a much better conductor of heat than steel, transmits heat rapidly from the valve head to the cooler regions about the stem. A valve stem with copper core 40 per cent of its diameter conducts as much heat as a solid steel stem three times the size.

The makers recommend the copper-cooled valve for use in heavy-duty and high-speed engines, and in engines with a tendency towards over-heating. Literature sent free on request.